Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL, AND OTHER IMPROVEMENTS

VOLUME XII. NEW-YORK, MARCH 7, 1857. NUMBER 26.

THE
Scientific American,
PUBLISHED WEEKLY
At 128 Fulton street, N. Y. (Sun Buildings.)
BY MUNN & CO.
O. D. MUNN, S. H. WALES, A. E. BEACH.

Responsible Agents may also be found in all the principal cities and towns in the United States.

Sampson Low, Son & Co., the American Booksellers 47 Ludgate Hill, London, Eng., are the English Agents to receive subscriptions for the Scientific American.

Single copies of the paper are on sale at the office of publication and at all the periodical stores in this city, Brooklyn, and Jersey City.

TERMS—$2 a-year,—**$1** in advance and the remainder in six months.

☞ See Prospectus on last page. No Traveling Agents employed.

Foolish Toys.

A correspondent, who had previously proved himself very skillful and ingenious, sends us an account of a locomotive he has made, with two pairs of drivers, etc., so small that it will stand on a 10-cent piece, and yet has all the principal working parts complete. Some parts of the reverse gearing are so small that they can with difficulty be recognised by the naked eye. We have little interest in such efforts, and much prefer to encourage our readers into a more profitable expenditure of patience and skill. See how snow can be kept off railroad tracks, and not how small you can make a locomotive. See how you can use coal without destroying the boiler, and not how small you can make the reverse gear. See how you can make springs to to save your machinery from rattling itself in pieces, or cars to save your passengers lives when in a smash, or tracks and wheels and signals to prevent a smash, and not be filing away on a bit of brass, wearing out your apron and your eyes to make a toy. Or, if your taste inclines to theory rather than stern practice, learn and proclaim the difference in constitution between cast and wrought iron or between either and steel; tell us why axles become more and more rotten and crystaline in proportion as they are used; why more axles, wheels, and rails break in cold weather, and why many, if not most, break the day *after* a very cold period, rather than during its continuance. Or, if these subjects are too high for your present grasp, read up what others have discovered, so that you may be prepared to begin. Don't sit down in ignorance of the first principles of the machine you are working on, ignorant even how to spell or use language skillfully, and labor for weeks and months to build a little contemptible monument to your own idleness.

Copper.

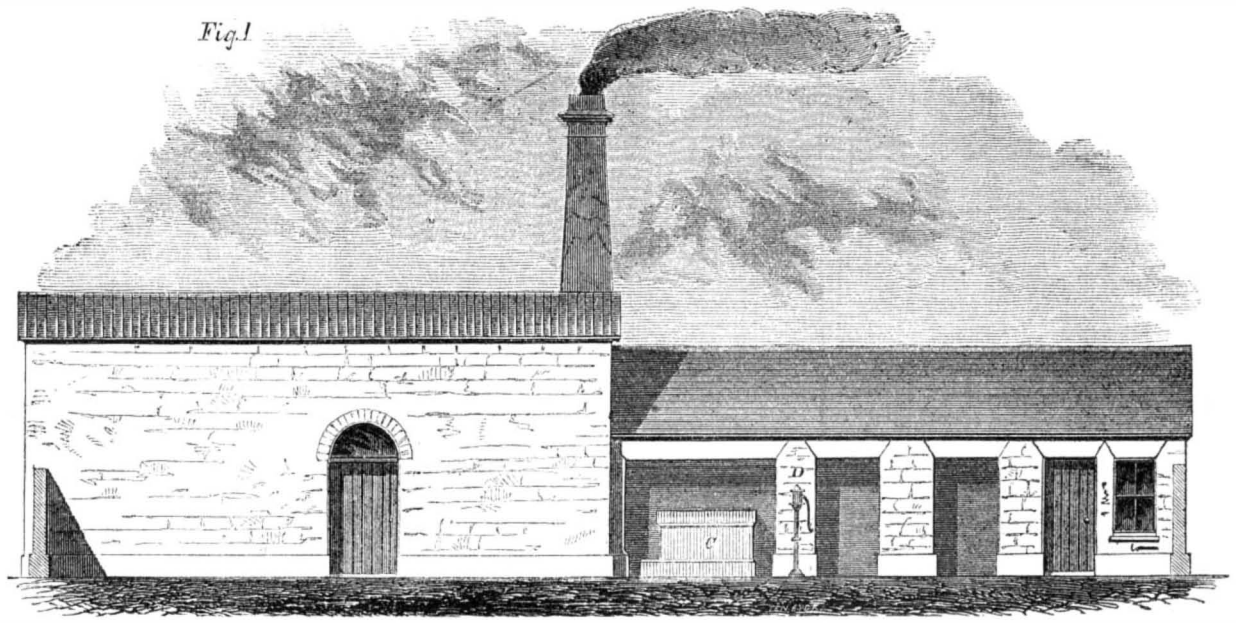
An interesting paper on the manufacture of copper has been read by a Henry Wiggin, to the members of the Midland Institute, Eng. In the course of it he stated that the principal sources from which copper smelters obtain their ores are from Cornwall and Devonshire, Chili, Cuba, and the Burra-Burra, and other Australian mines. Cornwall alone is producing upwards of 12,000 tuns of copper annually, and is the principal source of supply.

Copper ores generally consist of a great variety of substances, and the sulphurets, which form by far the largest class of copper ore raised, frequently contain sulphur, iron, silica or quartz, lime, alumina, magnesia, and small quantities of other metals, such as arsenic, antimony, tin, and silver.

The Academy of Natural Sciences, of Philadelphia, have memorialized Congress to give to the world a report upon the animal and vegetable life of Japan, Kamtschatka, and Behring's Straits, materials for which have been collected by the recent expeditions to those countries, but which have not yet been given to the public.

GAS LIGHT FOR VILLAGES.

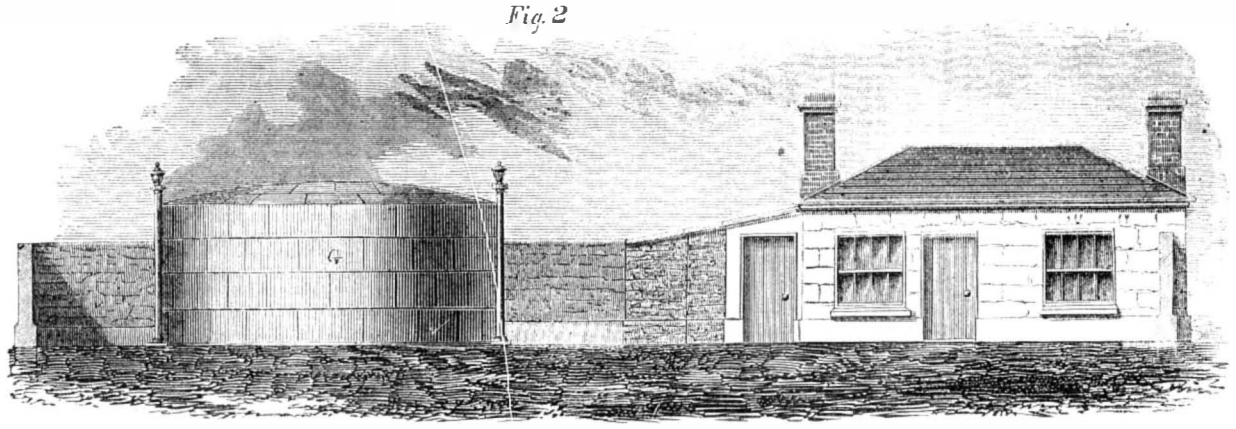
Fig. 1



The opinion has too long prevailed that gas light was applicable only to cities of considerable size, and that public gas works could not be conducted economically on a small scale. This idea has retarded its application in hundreds of places where it would prove a great benefit. The convenience, the cleanliness, and the beauty of gas for artificial illumination, in public and private houses, render it far superior to any other known illuminating agent. No cleaning of lamps are required; no grease or oil is spattered over carpets, clothes, and floors, by its use; and no fears need be excited on account of explosions in lamps and cans, as from alcohol-camphene fluids. To light a gas burner it has but to be touched with a match; to extinguish it a screw has but to be pressed with the finger and thumb. Gas illumination is one of the most humanizing agents of modern days. The London *Times* says, in reference to its genial influence, "If the railroad and the telegraph may be said to annihilate distance, save time, and so lengthen human life, such also has been the effect of gas in northern climes, for it has lengthened the day immeasurably. To the poor man who had but his penny candle at home to read by—to the workman whose business requires a strong but diffused light—to the million who wish to go out in dark nights—to the crowds who wish to assemble in public—the facilities afforded by gas have been immense: it has indefinitely added to the length of our days, and it has immeasurably added to the pleasure of our lives."

The remarks of the *Times* are true so far as they relate to the application of gas to cities, as in England, where it is used as the cheapest light by the rich and poor; but we wish to see the same advantages conferred upon villages as well as cities, and we herewith present a project to accomplish the desired object.

Fig. 2



This method, or rather scheme, we have obtained from the *Practical Mechanics' Journal* (Glasgow,) in which it is stated to have originated with George Bower, an engineer of St. Neots, England.

The accompanying illustrations are three views of a small gas-works; figure 1 is a side elevation, showing the front of the coal and the retort house, with its chimney; also the workshop and the gas-purifying apparatus C, and tar pump, D. Fig. 2 is also an elevation, showing the house of the superintendent of the works, and the gas holder, G. The plan view, figure 3, showing the locality of all the houses and apparatus, is placed on our last page, where a more full description will be found.— (*Continued on the Eighth Page.*)

Increasing Light by Revolving Mirrors.

M. Gadillot, of Paris, proposes, through one of the papers in that city, a novel plan of multiplying light by means of innumerable small mirrors, arranged in a particular manner, in a multitude of frames bound together. This framing is made to rotate. In front of its central point is placed a bright burner, the reflection of which illuminates every mirror, and multiplies the light infinitely. If between the burner and this system of mirrors a colored glass is interposed, the mirrors reflect the color. Where the light is not colored the reflecting power is said to be so great that a man may read by it at a kilometre's distance—about two-thirds of a mile—with great ease.

Heating Railroad Cars with Steam.

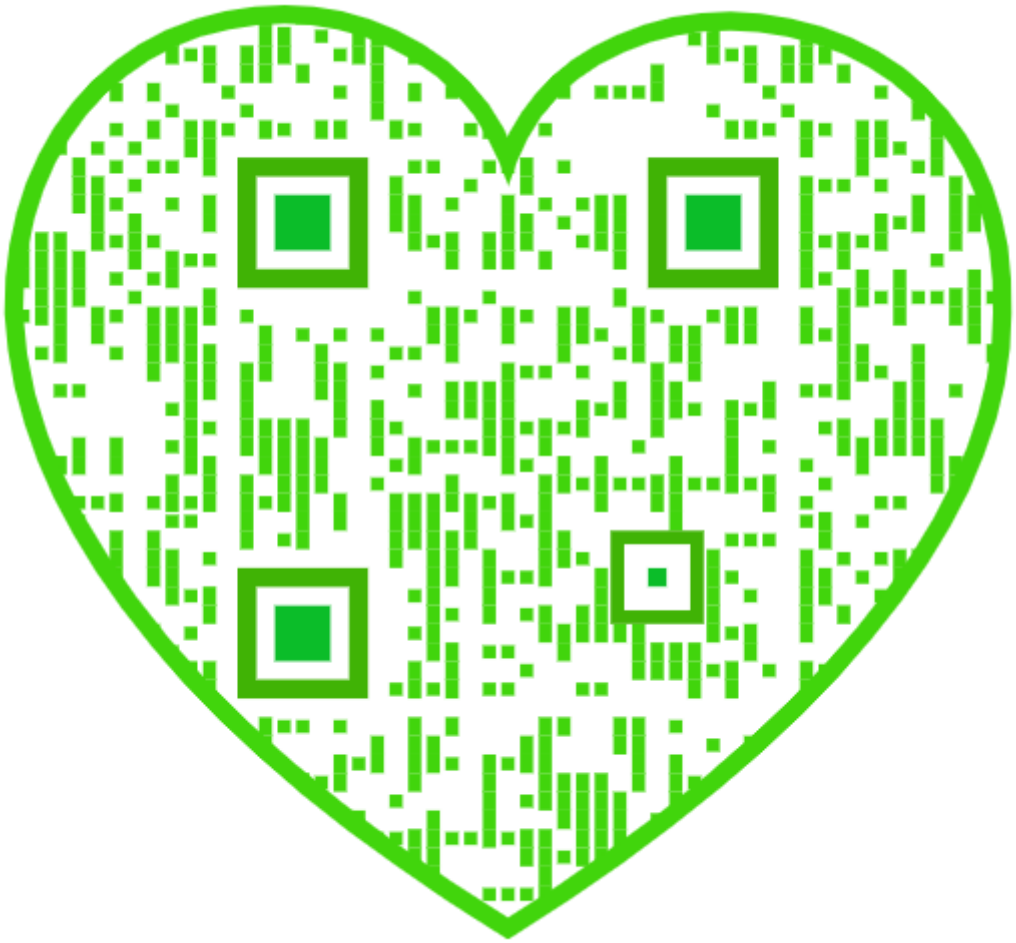
A few weeks since, a correspondent wrote to the Philadelphia *Ledger*, suggesting the use of steam for heating railroad cars, in the same manner it is now employed for heating ferry boats and steamships—by tubes. To this communication another correspondent replied, pronouncing the method an old and exploded affair; that it had been tried on some of the New Jersey railroads by Robert L. Stevens, and had resulted in failure. Another correspondent replies to this letter as follows:—

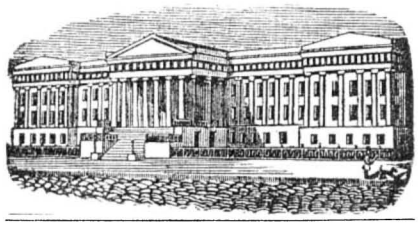
We have on the Little Schuylkill Railroad, at this place, a small passenger car, intended for the officers of the road, and for express purposes, which has been in operation for upwards of a year, and works to a charm. The car will seat from twenty to twenty-five persons comfortably, and a uniform warmth is felt throughout it. Although in use here on comparatively a small scale yet the principle is the same, and could be successfully applied to larger cars, and to the heating of an entire train. The steam is conveyed in pipes, properly secured, under the seats, and the connection between the engine and the car is made by coiled wire covered with india rubber, thus forming a complete flexible tube. There is also a cock at the forward end of the car, for the purpose of regulating the heat. This plan of heating was suggested and put into operation by Mr. Henry Clayton, the gentlemanly master mechanic of the Little Schuylkill Railroad at Tamaqua."

Townsend's method of heating railroad cars by tubes having flexible connections, like those described above, was illustrated in No. 2, Vol. 2, SCIENTIFIC AMERICAN. The only difference between the two systems was in the use of the heating agent; hot air passing through pipes from the furnace of the locomotive, instead of steam from the boiler, was the heating agent designed to be used by Mr. Townsend.

The Submarine Telegraph Bill has passed both Houses of Congress.

© 1857 SCIENTIFIC AMERICAN, INC.





[Reported officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING FEBRUARY 24, 1857.

PHOTOGRAPHIC GLASS HOLDER—Joseph Longking, of the Township of New Windsor, N. Y.: I do not claim any special arrangement of cutters; neither do I claim anything relating to photographic holders heretofore known. Neither do I claim, broadly, the making of metallic alloys out of lead, tin, and antimony. Neither do I claim, broadly, the substitution of one material for another.

But to the best of my knowledge, the photograph holder invented by me is a new article of manufacture, and exhibits properties and virtues which no other holder heretofore known presents.

Therefore, I claim a photograph holder composed of antimony, tin, and lead, alloyed in the proportions substantially as set forth.

[The holders hitherto employed to contain the glass in the camera for taking photographic pictures, have been made of wood, with glass corner-pieces cemented to them. The chemicals soon act upon the cement, and the corner-pieces fall out and soon become useless This improved holder is made of a metallic composition for resisting the action of the chemicals employed.]

IRON AND STEEL—J. G. Martien, of Newark, N. J. I do not intend to claim, generally, either the purification of fluid or molten iron, by forcing through, among or in contact with it, air, steam, or other oxydizing or purifying gases, or the employment of any chemical agents for the same purpose.

Nor do I wish to limit myself to any particular construction or arrangement of apparatus for the purifying or converting process, or the use of such chemical agents as have been specified.

But I claim, in the purification or conversion of fluid or molten iron, subjecting the molten iron to the action of atmospheric air, steam, or other gaseous body, or chemical agents, in any form capable of evolving oxygen or other purifying gas, in such manner as to cause the air, steam, or other solid, liquid, or gaseous body, to impinge upon, penetrate through, or search among the metal while it is flowing, or in a state of transit through a trough or conductor, or other place, substantially as and for the purpose specified.

[This patent is for one of a number of improvements invented for improving the iron and steel manufactures. It covers the supplying of air or other gases to metals while in a molten state and in motion through a trough or gutter, or any vessel fitted for the application of the air or gas to the metal.]

CALK FOR HORSE SHOES—Edward Maynard, of Williamsburgh, N Y.: I do not claim a movable screw calk for the shoes of animals.

But I claim the conical or tapering body, 1, of the calk, fitting a corresponding shaped hole in the shoe in which it is retained by the screw, 2, or its equivalent, substantially as and for the purpose specified.

IRON PAVEMENTS—Chas. Mettam, of New York City: I do not claim the casting of the blocks or plates with lateral projections on the lower parts to extend under the adjacent blocks or plates; neither do I claim the casting of the blocks or plates with tenons to enter mortises in the adjacent blocks or plates, when such tenons stand out laterally from the sides of the blocks or plates.

But I claim casting each block or plate with a number of hook standing out laterally from below the general level of the bottom thereof, and turning upwards in the form of vertical tenons, and with a corresponding number of mortises in the lower faces, so that when the plates are laid together the vertical tenons of one block or plate enter mortises in adjacent ones, and the mortises receive tenons of adjacent ones, while the laterally projecting portions of the blocks or plates make them mutually supporting, substantially as described.

[There can be no question but cast-iron blocks make a good and durable pavement when properly laid and fitted together. This improvement is designed for fitting the blocks together in a superior manner. Each block is cast with a certain number of hooks projecting laterally from the lower part, then turning upwards vertically in the form of tenons; there is also a corresponding number of mortises for the reception of these hooks in each block, and when all laid down, the blocks are firmly and solidly locked together, making a very solid pavement.]

STEAM BOILERS—J. J. Palmer, of Flushing, N. Y.: I am aware that the circulation of the water in steam boilers has been and is effected by the use and arrangement of heating flues, and therefore I do not claim generally producing such a circulation by the use of such flues.

I claim the particular arrangement of the flues, B b B b, substantially as described, close to the fire shell of the boiler, and admitting only a thin but continuous sheet of water between them and the fire shell; this thin sheet of water also connecting freely at top and bottom with the main body of water in the boiler, by which arrangement a more rapid and complete circulation is produced, this thin sheet of water being constantly forced towards and in contact with the sides and crown of the fire shell, i. e., the hottest parts of the boiler, and thus heated more rapidly and made to circulate the faster.

I also claim the arrangement of the perforated plate, E, it being interposed between the furnace and low exit into the smoke box or stack.

CORDAGE MACHINES—James Pine, of Hoosick Falls, N. Y.: I do not claim the use of stretching rollers, I I, except when used in a flyer, E, as described, Nor do I claim producing friction on the bobbins of the flyers, by means of springs applied otherwise than as described.

But I claim, first, the additional flyers, B, carrying the stretching rollers, arranged relatively to the main flyers, S, substantially as described, and deriving motion in the same direction as the said flyers; but at a less velocity, and operating substantially as specified, to stretch the strands, after they have received the usual twist, and to impart an additional twist, to compensate for the reduction of twist by stretching.

Second, the device for producing an uniform tension on the strands, by friction upon the strand boobins, consisting of the elastic curved lever, or combined lever and spring, h j, attached by a fulcrum pin, i, to the flyer frame and operating on one head of the bobbin, and upon the surface of the outer coil of yarn, or strand, on the bobbin, substantially as set forth.

[Several useful points are embraced in this patent for manufacturing rope. It has always been difficult to maintain uniform tension on the strand bobbins, because of the different quantities of yarn on them at different times; a remedy is provided for this. In making tarred rope it is very easily to work it while warm, but difficult while cold; a remedy is also provided for this defect. In stretching the strands prior to laying the rope, the twist is reduced; a remedy is also provided for this, and rope of a very superior character. is therefore the result of this invention.]

GRAIN SEPARATORS AND STRAW CARRIERS—Cornelius Van Derzee, of Albany, N. Y.: I claim the method of agitating and moving the straw, for the purpose of separating the grain from it, by rings or spokes rotating in connection with each other, or in reference to each other's movements, substantially as set forth and described.

SAW FILER—Archibald Robbins, Alanson Shewman, and L. R. Bigelow, of Watkins, N. Y.: We claim the combination and arrangement of the sliding carriage, F, the index wheel, H, arc adjuster, J, and guide frame, M, operating in the manner and for the purpose set forth.

FLOATING SECTIONAL DRY DOCKS—John Seely, of Buffalo, N. Y.: I do not intend to be limited to the particular dimensions given of the several parts of my improvements, as these dimensions and proportions may be varied as circumstances may demand. I do not intend to be limited to the use of a dip wheel for discharging the water from the docks, when circumstances shall render it more favorable to use pumps for the same purpose.

I do not claim the several parts described, except the tubular hinges, when used independent of the several combinations described.

First, I claim the combination of the conducting pipe, e c d, with the tubular hinges, a a b, and sectional dock, D, substantially as set forth.

Second, I claim the combination of the parallel braces, K K', turning upon joints, t t, with the floating docks, D D, and the wheel pit, W, for the purposes set forth.

RIBS FOR COTTON GINS—John W. Webb, of Cotton Valley, Ala.: I am aware that the whole surface of the rib, or the entire space between A and A, might be chilled, but in my opinion they would not be so good, as they would be more likely to break, besides, they would be far more difficult to cast, and it would be far more expensive to finish them than if they were chilled at A A, only as described.

I claim the new manufacture of cotton gin ribs, as described, that is to say, ribs of cast iron, with two places chilled upon them in casting, while the rib is so formed that the ends may be reversed in the same breast of the gin, so that when one chilled part of the rib is worn out the other may be brought to the working point of the gin saw, and thus effect an important economy in the construction of cotton gins.

SOLAR CAMERA—David A. Woodward, of Baltimore, Md.: I do not claim the photographing camera obscura, or the solar reflector and lens, or any part thereof, of themselves.

But I claim adapting to the camera obscura a lens and reflector in rear of the object glass, in such manner that it is made to answer the two-fold purpose of a camera obscura and camera lucida, substantially as and for the purposes specified.

HANGING THE SIEVES OF GRAIN SEPARATORS—Benjamin Wright, of Hudson, Mich.: I do not claim, broadly, the jarring of the shoe in grain separators in order to keep the grain sieves clear, as that is seen in many separators.

Neither do I claim supporting the ends of the shoe upon elastic bars, for this is seen in J. Behel's patent, Aug. 21st, 1847.

Neither do I claim hanging the shoe in adjustable hanging bars; an example is seen in Jno. Bambrough's patent, March 20th, 1847, of such bars.

Neither do I claim supporting the inner end of the shoe, as in S. Canby's parent, Dec. 28th, 1852. The screw rod or pin, F, in my device does not support the shoe.

Neither do I claim any part or feature of the described machine which is seen in any other grain separator But to the best of my knowledge and belief no grain separator has ever been made in which an adjustable rod or pin, F, and hooked stop plate, G, were used, in the manner and for the purposes I have described.

Therefore I claim as new in grain separators the use of an adjustable pin, F, and hooked stop plate, G, when the said parts are applied, and operated in the manner and for the purposes described.

[This improvement is designed to prevent the screens of grain separators from becoming clogged. The outer end of the screen is attached to two elastic bars, one on each side, and the inner end of it is connected to a pendant. A hanging pin is inserted in an open slot in the shoe, therefore as the shoe is shaked it receives a quick peculiar jerking motion, that prevents the creens from clogging.]

METALLIC LATHING—Wm. E. Worthen, of New York City: I know that corrugated iron has been used for floors, it is also employed for partitions, but it is, as far as I know, lathed either with iron or wooden laths riveted on. I know also that iron lathing having a section like a C, and other sorts of iron lathing having been used. I therefore claim none of these as my invention.

But I claim corrugated metal provided with tongues slit out of the body thereof, and bent away from their original position, substantially as specified, and constituting as a whole an article to be used in building, substantially in the manner and for the purpose set forth.

I also claim such tongues formed substantially in such a manner, on and out of corrugated metal, when they are dished or concaved, substantially in the manner and for the purposes described.

SHOVING POLES FOR STEAMBOATS—D. Cumming, Jr. (assignor to D. Cumming, Sen.) of Mobile, Ala.: I do not claim the suspending of bodies upon swivels or universal joints, as that is a very old method.

Neither do I claim the general application of steam in a direct manner to tool handles and other kinds of implements, for I am aware that steam has been thus applied to hammers, tree saws, pile drivers, drills, &c.

Neither do I claim broadly, the employment of a steam engine for operating poles for pushing boats along; an example of such employment is seen in John Dougherty's rejected application for a patent dated May 27th, 1847.

In this device the engine is a stationary one, located in the central part of the vessel. A shaft which communicates with the engine, extends across the vessel, as in other steamers. The poles are placed on the side, and operated by the shaft. This is a very cumbersome and clumsy arrangement; it could not be used except with great difficulty for the purposes for which my improvement is applicable.

Other devices for pushing boats along have been invented, but the shoving pole or rod has never been combined directly with the piston of a movable or portable steam cylinder, such an arrangement is, therefore, a new combination. Nor has any other apparatus for shoving off boats ever been invented which was so well adapted to the purpose, and so highly useful as that described by me.

I claim the combination of the shoving pole or rod, G, directly with the piston, a, of a portable or movable steam cylinder, when the parts are arranged and employed in the manner and for the purposes substantially as described.

[This invention is designed for shoving steamboats off bars and shoals. A small steam engine is fitted to the bow of the boat; in its cylinder is a piston, attached to a universal joint, and a pole is connected to the piston rod. Steam from a boiler in any part of the boat is conveyed by a flexible or other tube to the cylinder, and the pole is operated by the piston, shoving the pole to force the boat off the shoal. The small engine is peculiarly constructed, and is capable of being easily moved to any point of the boat, for more effective action.]

KEEPER FOR RIGHT AND LEFT-HAND DOOR LOCKS—Calvin Adams, of Oak Hll, N. Y.: I claim the use of a beveled keeper, such as described, when employed in connection with a double-faced lock, having a blunt bolt, so that the lock may be used on a right or left-hand door, without changing any of its parts, as set forth.

HAND SEED PLANTERS—J. H. Bruen, of Penn Yan, N. Y.: I claim the thin broad extremity, F, or its equivalent, at the lower end of the rod, B, acting as a cam to open the blades, by giving said rod a partial turn with the hand, substantially as specified.

Also, in combination with the above, the arrangement of the seed distributor, G, on the rod, B, whereby the seed is made to drop simultaneously and only with the opening of the blades, as described

I also claim the star or coral-shaped attachment, I, of the rod, B, operating as described, so as to insure the regular action of the seed distributor.

HINGES—J. D. Browne, of Cincinnati, Ohio: I do not claim the inclined planes on the joints or bearings of a hinge, as they are well known.

I claim, making one part, b, of the bearings of a hinge, concentric to the other part, a, as described.

CAST-IRON KETTLES—C. C. Bradley, Jr., of Syracuse, N. Y.: I claim the arrangement of the revolving shaft, vertical fans, and the grindstones, with respect to the kettle, as describe, when the grindstones operate upon successive portions of the kettle by a change of velocity in the shaft, as set forth.

CAUTERIZING SYRINGE—E. T. Bussell, of Shelbyville, Ind.; I claim the combination of hollow plunger, B, with cauterizing rod, C, encased, and divergent spring fingers with absorbent bulbous extremities, all connected with cylindrical tube, A, substantially as set forth and for the purposes specified.

FILE CUTTING MACHINE—I. H. Coller, of Poughkeepsie, N. Y.: I do not claim the manner of automatically graduating the blow by the action of the cams and springs—but I claim, as an improvement on the mode patented by Conklin, Sidman, and Whritner, the jointed frames, P Q R D, for transmitting the graduated effect of the springs to the hammer, so that the rods holding said springs will not vibrate from the movement of the hammer.

I also claim the combination of the lever jaws with the spring tang holder, arranged and operating substantially as and for the purposes set forth.

COMBINING HYDROGEN AND WOOD GAS—Warren C. Choate & C. N. Tyler, of Washington, D. C.: We claim combining hydrogen gas with the gaseous products evolved from the dry distillation of wood, in the manner substantially as and for the purposes described.

ROTATING BREECH FIRE ARMS—Samuel Colt, of Hartford, Conn. Patented in England March 3, 1853: I am aware that the many-chambered breech, in repeating fire arms, has been rotated to shift the chambers, and the several chambers in succession held in line with the barrel during the discharge, by means of a driving pin receiving motion from the cock, and working in longitudinal and diagonal grooves made, sometimes, on the outer surface of the said breech, and sometimes on the inner surface of the central bore; and I am also aware that the breech has also been thus operated by the driving pin working in radial and diagonal grooves made on the rear flat face thereof, but when so made, the grooves being formed in a flat surface, and the cock, which imparts motion to the driving pin, working on a fulcrum or central pin, it was necessary either to connect the driver with the cock by a joint pin, or to give the driver, a considerable end play to compensate for the difference between the curvilinear motion which the driver would receive from the cock, if directly attached to it, and the flat surface in which the grooves are formed. These defects I have avoided by making the radial and diagonal grooves in the rear end or face of the rotating breech, which is so concaved that the surface thereof will correspond with the curvilinear motion of the driver vibrating on the axis of the cock. I do not therefore wish to be understood as making claim, broadly, to the method of rotating the breech by a driving pin working in grooves, but to limit my claim to the special improvement which I have made thereon.

I claim making the series of grooves to be acted upon by the driving pin, to rotate and hold the breech in a concavity in the rear end of the rotating breech, substantially as and for the purpose specified.

ELASTIC CAP FOR SEALING CANS, &C.—Mrs. Rhoda Davis, of Brookhaven, N. Y.: I do not claim to be the inventor of flexible caps for covering the mouths of jars; neither do I claim their exclusive use. Closing the mouths of vessels by means of caps has been practiced from time immemorial; but, in general, the caps employed are inconvenient because they require to be tied on or sealed with wax in order to render them tight.

But a self-acting cap made of india rubber, in the forms described, and possessing the virtue of yielding when drawn over the mouth of the jar, and then contracting so as to fasten itself securely around the lips of the vessel, rendering the mouth thereof perfectly air-tight, is, to the best of my knowledge and belief, a new article of manufacture.

Therefore I claim as a new article of manufacture, a cap or or cover for sealing vessels, composed of india rubber, when made in the form and possessing the virtues substantially as described.

[This invention consists of a tight india rubber cap, which when stretched and drawn over the top of the bottle, it contracts and fits close around its neck, sealing it perfectly air-tight at once. It is a very convenient and useful improvement for the purpose, and in all likelihood will soon displace the leather cap, which requires to be tied with a cord.]

GIG MILLS FOR NAPPING CLOTH—Ernest Gessner, of Aue, Saxony: I claim, first, the arrangement of the parts of the machine, substantially as described, whereby it combines the properties of napping the cloth while it is continually moving over the surface of the napping cylinder, of holding the cloth stretched in the direction of its breadth; of presenting the cloth to the napping cylinder in such manner that the face which receives the nap is exposed to view, and of operating on the cloth at several points of contact at the same time.

Second, the arrangement of the four guide rollers, U U U U, so as to be simultaneously adjusted by screws, V V', or their equivalents, applied to their bearings, substantially as described, to bring the cloth into more or less, intimate contact or with a greater or less surface in contact with the napping cylinder.

[By this machine, the cloth is napped while moving over the surface of the teasel drum, and kept fully stretched in the direction of its breadth. The finishing of broadcloth to produce the nap upon it—laying all the wool in one direction—involves much tedious labor by common machinery used for this purpose. This invention is designed to economise labor, execute the work more rapidly, and in a superior manner.]

SUPPLYING HOUSES WITH WATER—Thomas Hanson, of New York City: I claim the combination of an hydraulic engine with, and interposed between the supply pipe, from the street main, receiving water, from a head, and the house pipe or pipes, and a cock or cocks for supplying water to the lower story or stories of a house by the force of the said head, and the pump operated by the said engine, and receiving water from the same head, and discharging it into a reservoir or reservoirs for the supply of the upper stories of the house, substantially as and for the purpose specified.

MARKING SLATES—John W. Hoard, of Providence, R. I.: I do not claim liquid quertz itself, for producing indurative surfaces for marking upon.

But I claim it as the vehicle for manufacturing artificial marking or writing slate, when combined with oxyd of zinc, as a drying anti-deliquescent and coloring substance, in the manner and for the purpose set forth.

[This useful invention embraces the use of soluble quartz as a vehicle for making writing slates of any color. The quartz solution is combined with any anti-deliquescent, drying or coloring substance, suitable for the purpose, and in a pasty state it is spread smoothly on leaves of wood, sheets of pasteboard, or sheets of metal, to which it firmly adheres, soon dries, and is fit for use, thus making strong, cheap, and beautiful slates.]

CASTING SKEINS FOR WAGONS—Andrew Leonard, of Kenosha, Wis.: I claim the method, substantially as set forth, of molting and castiug thimble skeins and other hollow conical castings, in a vertical position, from whole patterns, leaving their own cores of green sand, which were molded in the hollow of the patterns around one end of long core bars, so arranged and combined with the cores and with the solid sand in the flask, as to have the other end of the same bars sustain the core, or to render them adjustable by hand after the patterns are withdrawn and the mold completed, as specified, and of thus ensuring the true position of the cores in the center of their molds, and making the casting perfectly true and seamless direct from the sand, substantially as described and shown.

SAW SET—Joseph D. Spiller, of Concord, N. H.: I claim combining the gauge and bearing screw in one movable frame applied to lower jaw, and furnished with a set screw, substantially as described.

OPERATING MANDREL CUTTERS—Peter H. Niles, (assignor to himself, Nehemiah Hunt, Ralph C. Webster, and Alfred Douglas, Jr.,) of Boston, Mass.: I do not claim a chuck with movable jaws.

But I claim the method described of operating the cutters of a revolving cutter head, viz., by means of the springs, d d', inclined planes, c c', and the sleeve, D, operated by a cam, F, in the manner as set forth.

PREPARING ALKALINE SILICATES—John M. Ordway, (assignor to the Roxbury Color Chemical Manufactory) of Roxbury, Mass.: I claim the manufacture of soluble silicates of soda or potash from the sulphates of soda or potash, by fluxing the same with silica and deoxydizing agents, in the manner substantially as set forth.

RE-ISSUES.

BITUMINOUS GROUND FOR PHOTOGRAPHIC PICTURES—V. M. Griswold, of Lancaster, O. Patented October 21, 1856: I claim sensitized bitumen, prepared as above, for the purpose of taking photographic impressions on paper, metallic sheets, or other substance.

COMBINED CALDRON AND FURNACE FOR AGRICULTURISTS, &C.—Jordan L. Mott, of Mott Haven, N. Y. Patented December 1, 1840. Extended December 1, 1854. Re-issued February 6, 1855: I claim combining a caldron with a small square or rectangular box stove of less area than the caldron, by spreading out the upper part of the box stove to a circular form to surround the caldron by a flue space, substantially as and for the purpose specified.

I also claim making the casing to form a flue space around the caldron, by the elevating and spreading the plates of the stove, in combination with sectional side pieces, substantially in the manner and for the purpose specified.

LOOMS FOR WEAVING PILE FABRICS—Erastus B. Bigelow, of Boston, Mass. Patented November 15, 1853: First, I claim the method of constructing and operating the pincers, or other equivalents, for successively operating the pile wires so that they shall carry said pile wires forward to the fell of the cloth, and hold them in position with their proper edges upwards until they are otherwise secured, substantially as specified.

I also claim constructing the pincers for successively operating the pile wires with grooved jaws opening and closing in a line with the pile wire, and in advance of the lathe, substantially as specified, whereby collision with the lathe is easily avoided.

I also claim the employment of a support or guide to successively receive the ends of the pile wires as they are drawn from the cloth, and carry them to the position where they are to be introduced into the shed of the warps, and guide them therein, substantially as specified.

I also claim the employment of long horizontal guides to guide the pile wires as they are being inserted in the shed of the warps, substantially as specified.

I also claim holding the pile wires, and guiding and adapting the pincers or their equivalents to a suitable position to engage therewith, substantially as specified.

I also claim in combination with the pile wires, a bar or guide, which shall successively press against said pile wires to keep them in a proper position during the operation of cutting the pile, substantially as specified.

And I finally claim the method of applying the tension weight and brake directly to the whip roller by means of the arms, g6, and i6, substantially in the manner and for the purpose specified.

Coal for Locomotives.

One of the Manchester (N. H.) Locomotive Co.'s patent coal burners, running on the Chicago, Burlington, and Quincy Railroad, in Illinois, has been running an average of 89 miles, hauling average loads of 418 tuns, with an average consumption of 4980 lbs. of Illinois coal per day. The speed is not given in the report before us, from which we infer that it was very moderate, and thus the most favorable conditions existed in this respect, as indeed they should, to produce such results. The cost of coal on that line being only $2·50 per nett tun, the cost for fuel per mile run, including that of the wood to light the fire, is but seven cents and a half. At $6 per tun, the average price of coal in the Eastern States, the cost of fuel per mile for this heavy freight train, would be, by this data, but fifteen cents and a half, or very much less than wood. Nearly eight pounds of water were evaporated for each lb. of coal consumed—a result which would be considered very satisfactory even in stationary or marine boilers. The company manufacturing this variety feel very confident in its ability ultimately to supersede wood-burning engines for all freight trains.

Gunnery and Iron Guns.

Naval gunnery, as a science, presents many curious facts. In firing into masses of timber, or any solid substance, that velocity which can but just penetrate will occasion the greatest shake, and tear off the largest and greatest number of splinters; consequently, in close action, shot discharged with the full quantity of powder tears off fewer splinters than balls fired from the same nature of guns with reduced charges. In naval actions shot intended to take effect upon the hull of an enemy should rather be discharged with a falling than a rising wave; but such pieces as may be appointed specially to act against the masts and rigging should be fired with the rising motion, the aim being taken low.

A writer in one of the London papers asserts that cast iron is the best known material for cannon. One of the cast iron guns taken at the capture of Bomarsund underwent an experimental trial, and the Russian metal, contrary to all expectation, withstood the experiment unharmed.

The grand object is to have the iron properly made. Iron smelted with mineral coal is always inferior to that smelted with charcoal, and herein consists the secret of the superiority of the Russian cast iron guns over those of the British.

The effort in Congress to reduce the tariff on sugar, wool, and railroad iron, together with that on various articles of less importance, may, if successful, have a quite important influence on the woolen and iron manufacture, the tendency being to revive the former and depress the latter.

© 1857 SCIENTIFIC AMERICAN, INC.

[For the Scientific American.]

On Priming in Steam Boilers.

I have read the valuable paper of M. Battel, in your columns, on the subject of steam boilers. In the main points of his article, I heartily concur, especially as it relates to the proper construction, and the management of boilers; also as to the non-mysterious cause of explosions. I will, however, present my experience with boilers, which, in some features, differs from his especially in regard to foaming or priming.

He says that he has used in his boilers gutter water, snow water, &c. He knows that steam is made of pure water only, and leaves the residue a sediment—either to go to the bottom or to coat over the fire surface and flues with scale. It is very commonly known to engineers that snow water is the very best to use in a boiler; pure rain water does not excel it; I have frequently taken a thin scale off my boilers by this means alone, and have never seen snow water foam.

Mr. B. seems to have overlooked the important fact, that boilers will foam when dirty as well as when new, and especially if the dirt be soft mud or clay, but that this can be prevented I do not deny, if engineers have the means to do it.

Now I will give you my own case for the last two months, as an instance. I have charge of an engine 325 horse-power, driven by two eight-feet shell 26 feet long boilers; we take steam for warming from the same boilers through four-inch pipe, at 40 lbs. per square inch on boiler, per (Ashcroft) gauge, and the piston travels 448 feet per minute, 7 feet stroke, cut-off 17 inches; these are as per indicator, and no guess work. I have only one pump (*i. e.* force pump) to the boilers, and runs 224 feet per minute, or half stroke of cylinder, and by running so fast, it sometimes fails, as the valve stems break, but I have others always on hand to prevent stops. There is a city water pipe attached, and when there is plenty of water it will run in at 30 lbs. pressure; this we use to wash out with. Our injection is taken from the Chenango canal, which is constantly yellow with mud or clay; and to use it four weeks without blowing out, it gets so thick in the boiler that it will stop up the gauge cock, and I am obliged to leave them open a very little that the steam may have a passage.

For two months previous to the late great thaw, we were very short of water, and could not blow the boilers out, so we were obliged to run with dirty water, and in consequence of this the boilers foamed, and oftentimes so violently as to lower the water from the upper to the lower cock in a few minutes; this I could always tell sooner in the engine room than my men in the fire-room, and I took the only means I had at hand to stop it, viz., throttling the steam and increasing the pressure.

But it may be asked, why did I not blow off from the surface, as in salt water, once an hour or so? I had no surface cock on, and one could not be put on while steam was up; and I also had as much steam to make as the boilers could well generate, so that I had no chance to pump an overplus of water to be blown away. And, besides, this would have increased the consumption of fuel, and very likely some of our directors would next ask the reason for it; this latter, however, would have made no difference to me, for if I had had the opportunity to blow off I should have done so.

But some of your readers may say we have run boilers when dirty, and no foaming had occurred; then I must refer them to the velocity of my piston, and ask, "Does yours run 448 feet per minute? I have run boilers very dirty, but not with such a velocity of piston, without priming. I have also put perforated plates over the mouth of the steam pipes with good effect to stop priming, but have never been guilty of putting "substances" into the boiler to stop priming and foaming.

J. J. Killingworth,
Engineer Utica Steam Cotton Mill.
Utica, N. Y., Feb. 26, 1857.

Chimney Walls.

Messrs. Editors—In the article in the Scientific American, of Feb. 13, on building chimneys, you have given the true theory (keep inside hot), and recommend a thick wall to keep out damp and cold; I would suggest a hollow wall for that purpose, which I have found, from experience, to insure a good draft. Build the chimney straight inside, and plaster smooth, leave an air space of about two inches, tied occasionally; taper outside, or batter one-quarter inch to the foot; this looks well. Then run both walls into one, at about eight or ten feet below the top. Such chimneys we are building for steam mills to factories, and think the same plan would do well for houses.

L. Hatfield.

Cuyahoga Falls, Ohio, 1857.

[Our correspondent's information is correct and useful; hollow walls are undoubtedly the best, as there is no better non-conductor than an air space between two walls. We hope soon to see this correct principle of building brick walls applied to all buildings—it is now, to some extent, used in Boston at least.

The Lost Arts.

Messrs. Editors—In the Scientific American., (page 170,) there is an article referring to that mooted question, or topic, "The Lost Arts," in connection with what Bayard Taylor is believed to have stated. Now Wendell Philips, Esq., lectured in this city, this winter, on this very subject, and said many strange things. I give a few:—

Swords were made of such a nice temper and quality that the finest threads of silk were thrown from the point of the sword and cut asunder in the air with ease—being much nicer than our best razors now are. Tools were made of copper better than our finest steel. This could not be done now. Paintings which had been buried for centuries came out with all the freshness and beauty of a new work; while, at the present time, paintings fade and become old within the memory of a middle-aged man. Glass was made into the most various and beautiful forms two thousand years ago—the like of which cannot be done now! Ancient engineers were far in advance of moderns: immense masses of stone were raised to great hights by what means is not now known, neither can modern engineers do such work with all their improvements.

And lastly, steam and its uses were not unknown to the ancients. Most mechanics suppose steam and the steam engine are modern inventions or discoveries; but this is not so. What conceited fellows we moderns are! A. M. S.

Lowell, Mass., Feb. 26th, 1857.

[We are perfectly willing and ready to give the ancients credit for every art in which they excelled the moderns, but at the same time Wendell Phillips gives them credit for that which they never possessed. In architecture and sculpture, and massive works of civil engineering, they have left positive proof of their genius, energy, and power, and in many other things, when we moderns compare ourselves with them, it takes some of the conceit out of us.

The copper tools of the ancients were inferior to modern steel tools; and if they carved stone now too hard to be worked, it was because, like many kinds of stone now quarried, it worked easier when fresh from the earth. The ancients knew as much about the steam engine, as the boy who drives his toy wind-mill made of wooden slats, by steam issuing from the spout of his mother's tea kettle. Our moderns can paint in as enduring colors as the ancients. Mr. Phillips should have stated that the exhumed ancient pictures to which he referred, were not painted on canvas but on stone, or slabs of pottery ware. We have engineers who will contract to build works as massive as the pyramids of Egypt, if they are paid well for it—but "there's the rub." The swords possessing the fine temper boasted of by Mr. Phillips can be imitated now: they can be made as sharp in the edge as a razor, and in the hands of a skillful person, the feat of cutting a silk thread in the air could be performed easily.

Chinese Sugar Cane.—How to Economise in Planting it.

Messrs. Editors—I perused with much interest the article in a late number of the Scientific American by Mr. H. G. Bulkley on his experiments with the Chinese sugar cane. Mr. B., like myself and many others, did not regard the article as worth much attention.

Last spring I obtained a small quantity of the seed in Philadelphia; although well recommended I regarded it of no consequence, and planted only a little, for the curiosity of it, and hence little attention was paid to it. I distributed the balance of the seed among friends, who, like myself, regarded it as nothing more than an ordinary variety of the broom corn family. But in September and October we all discovered the canes contained an immense quantity of rich sweet juice, capable of being converted into a fine syrup.

At the end of the row, where it had room, I found it tillered out, producing four canes from a seed. I examined some planted by Mr. William Chorlton, at New Brighton, Staten Island. In some hills, several canes were left to grow just as they came up, and others were thinned out to one plant in a hill, these tillered out, and produced from six to a dozen fine canes, all about the same hight.

Mr. J. R. Thomas, of Waverly, Ill., says he planted the seed I sent him, one seed in a hill, three feet each way, and it tillered out and produced a dozen good canes to the hill; he is so well pleased with it that he intends to plant about thirty acres of it this year. As he is an old resident of New Orleans, and understands sugar-making, he knows the value of this new plant.

Many of my canes weighed 1 3-4 lbs. each; they will certainly average 1 1-2 lb. each. An ounce of seed will plant 1,400 hills, one seed in a hill, and produce from 5,000 to 15,000 canes. The ground should be plowed or dug deep, made rich, and in good order, and the hills three feet apart. If two or three seed are put in a hill, the plants should be thinned out to one; it roots well, and there is no danger of it blowing down. It wants light and air, and should not be planted too thick, or it will prevent the perfecting of the saccharine juices of the plant. J. C. Thompson.

Tompkinsville, Staten Island, N. Y., 1857.

[This is useful and seasonable information to those who intend to plant the *Sorgo Sucre* during this season.

(For the Scientific American.)

Experiments on the Motions of Bodies.

I have recently made some experiments to demonstrate what I believe to be the law of motion in bodies, and will briefly describe them, as they may be of interest to many mechanics.

I first used a heavy iron weight, suspended as a pendulum by a string, and an iron ring resting on a steel point; the length of the apparatus was about nine feet. I allowed it to swing gently till it ceased moving of itself. After moving a short period of time the motion always became slightly elliptical, and this was sufficient to cause the weight to rotate on its axis; of course, a ball so suspended could only make half a rotation. Next I suspended a piece of tin on a steel point, so constructed as to be entirely free to rotate, and a slow circular motion was communicated to this apparatus. Subsequently I used a still more simple apparatus, viz., a pail with water in it, suspended by a string, and made to move in a circle. In all these experiments the rotary motion invariably accompanied the circular or elliptical motion. If the apparatus moved from west to east, the rotary motion was from west to east, or contrary when the primary motion was from east to west, the rotary motion was in the same direction.

If in these experiments the rotation was in consequence of friction against the air of the part making the largest circle, it would be in a direction contrary to the primary motion, but the rotation was invariably in the contrary direction against the air.

Suppose a body three inches in diameter revolving in a circle—its extreme edge having a radius of 24 inches, and its inner edge 21 inches—now it will not be questioned that the momentum of the part having a radius of 24 inches is greater than that having a radius of 21 inches. This is the theory, and it is found to hold true in a variety of very dissimilar experiments, the resistance of the air and friction of bearings being insufficient to counteract the momentum of the part having the greatest velocity, and the result is, the body rotates on its axis.

Now on what principle of sound philosophy can it be asserted that the planets are not governed by the law here stated, when they certainly are subject to all its essential conditions? If it be admitted that the globe, as a whole, is governed by the same laws to which its various parts are subjected, then we can solve several interesting philosophical problems. C. Dowden.

Newark, N. J., Feb., 1857.

Antimony, Bismuth, and Cobalt.

In a lecture recently delivered before the Royal School of Mines, England, on the property of these metals, the lecturer (Dr. Percy) remarked as follows:—

When copper was mixed with antimony in excess, it formed a regulus of beautiful violet color, which by the old alchemists was denominated regulus of Venus. Antimony entered largely into the composition of type metal; a good mixture for this is three parts of lead and one of antimony, and sometimes a small quantity of tin is added. He did not believe there was any specific standard for type metal, as, in many cases, the several founders had each a formula of their own. When antimony was alloyed with copper it was found brittle; the specific gravity of this alloy was greater than the mean of the two metals. It had been proved that antimony had been used in the composition of bells, and a work was published in Madrid, in 1567, which stated that several bells in Spain contained that metal. The Chinese had likewise used antimony for the purpose of making mirrors. This composition consisted of copper, 80·33, lead, 9·71, antimony, 8 43, and of iron a mere trace.

A patent metal had been invented by Mr. Wetterstedt, for the purpose of sheathing ships. He had not heard much of this, and, therefore, presumed its application had not been so successful as had been anticipated. This metal was composed of antimony, 4·3, lead, 4·4, mercury, 1·3.

Bismuth had been known for the last three hundred years. At first it was mistaken for lead, and as such often used in cupellation. Its ore occurs with several other metals, more especially cobalt.

Commercial bismuth was never pure, and sometimes it contained as much as sixty ozs. of silver to the tun, and this he wished to be publicly known. According to Scherer, the specific gravity of the crude metal was 9·783, while that of the pure metal was 9·779. Its melting point was 264°. It did not sensibly oxydize when exposed to moisture.

Berthier had stated that an alloy of 66 parts of lead and 34 parts of bismuth was more tenacious than lead, possessing a color between tin-white and lead-grey. This could be beaten out into thin foil, and was fusible at 166°. Bismuth could be mixed with mercury without the latter losing its fluidity. Lead and bismuth were often used for the purpose of adulterating mercury, and bismuth was likewise employed for the purpose of silvering glass.

Cobalt had been used as a coloring matter in ancient times; but the blue glass and the enamels in the British Museum which he had examined, had received their colors from copper, not cobalt. In Saxony and Norway, where there are large establishments for the reduction of cobalt, the operations are carried on with great secrecy.

Cobalt sold some years since for £2 2*s.* per pound, now it only realised 18*s.* The mode of separating cobalt from nickel could be found in Gmelin's Handbook of Chemistry, and other works. The oxyd of cobalt had been found in Missouri, accompanied with oxyd of manganese. The introduction of artificial ultramarine had greatly lessened the price, it now being used in several instances in lieu of cobalt.

There is said to be an oak tree near Raleigh, N. C., which, at the sun's meridian, overshadows a space of 9000 feet. It would afford a shelter for 4500 men.

© 1857 SCIENTIFIC AMERICAN, INC.

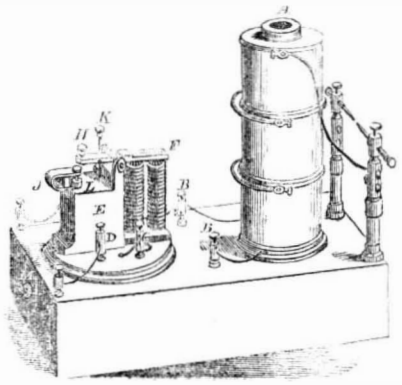
New Inventions.

New Electric Induction Apparatus.

Attempts have been made to construct induction apparatus of large dimensions, in order to obtain electric currents which should, as it were, stand midway between those obtained from the electric machine and those obtained from the voltaic battery, and several *physiciens* and artists have been occupied with the study of the phenomena connected with the subject.

The accompanying figure represents a new apparatus of this character, constructed by Emil Stohrer, and described in Poggendorff's *Annalen*. The apparatus consists of the following principal parts :—1. The primary coil, with a bundle or iron wires. 2. The three single induction coils. 3. The interruptor. 4. The discharger. 5. The condenser.

The primary coil itself is not to be seen in the figure, but the upper end of the bundle of iron wires is seen at A. The latter consist of wires which stand loosely in a thin cylinder of wood, so that they may be taken out of it singly. The little bars are varnished with shellac. The primary coil is wound on the wooden cylinder ; its wire is ·03937 inches thick, and is formed of six layers of the double wire. The ends of the spiral are connected with the clamp screws, B B. It has an external diameter of two inches, in which a coat of strong gutta percha is included. The wires are varnished for the sake of security.



The induction spiral consists of three single coils, which may be easily taken off the primary, and united at pleasure one with another. The central cylinder of the coils consists of pieces of paper glued over each other and saturated with varnish. The walls of the coil are of wood, the best for this purpose being pear tree wood. In winding the fine wire and its insulation, the greatest care is necessary. By making three compartments an approximation of the parts of the induction wire which lie at a great distance from each other is avoided. Small sparks pass from one layer to that above it, when the excited spiral is observed in the dark. There is no means of avoiding this, except by adding to the varnish covering which surrounds the wires another coating which shall be impervious to such sparks.

A small glass tube is introduced at the inner side of one of the walls of the coils, so deeply into the wood that it does not project beyond the inner surface ; at the circumference it protrudes a little. This tube receives a copper wire, to which the inner end of the fine wire is soldered. The wire is overspun with silk and varnished before it is laid on. After the completion of each layer, a mixture of one part of white wax and one part of resin is laid on hot with a camel's hair pencil, and the entire wire is kept warm by an alcohol lamp placed beneath it. By this means all spaces are penetrated and filled with this good insulating substance; the whole forms, upon cooling, a firmly connected cylinder, which it is hardly necessary to protect from external injury, for it is known that the mixture of wax and rosin is made use of as a very firm cement. The outer end of the connections is also soldered to a strong copper wire, which is cemented in a small glass tube. Both ends of the wires are, therefore, well insulated by glass, and lie far from each other. The two copper wires project two lines outwards, so that binding screws may be readily attached to them.

All three coils are wound in the same manner and in the same direction; they are so pushed on to the interior spiral that the ends, of all the interior wires stand on one side while all the external ends are at the other, in a vertical direction. The lowest coil rests upon three small pillars of ivory, which are not seen. From the upper and under ends of the system of coils the wires are carried directly to the discharger.

The interrupter, E, is placed upon a wooden foot, and may also be made use of for other purposes, as it can be taken away at once after the connection wires have been removed. An electro-magnet, round which four layers of the same double wire which is used in the inner spiral are coiled, acts on a perforated and grooved iron cylinder, F. The latter is attached to a strong lever, H, which is drawn downwards by a spiral spring. The platinum point of the screw of H, at the extreme end of the lever presses forcibly on the upper portion of a strong copper spring, J. On the upper surface of the spring is placed a disk covered with platinum, which can be caused to rotate, and is touched by the platinum point, not at the center, but somewhere between the center and circumference. This is for the purpose of changing at pleasure the point of contact without filing.

Under the projecting portion of the spring, J, there is a screw, L, which, where it rises, supports the spring so that the latter loses its property of yielding, the descending lever thus meeting a firm surface below. Besides this, between the limbs of the spring a bit of cork is fixed, for the purpose of checking the vibrations, which are not favorable to the development of the induced current. There is another screw, K, by the turning of which a greater or less degree of tension may be imparted to the spiral spring.

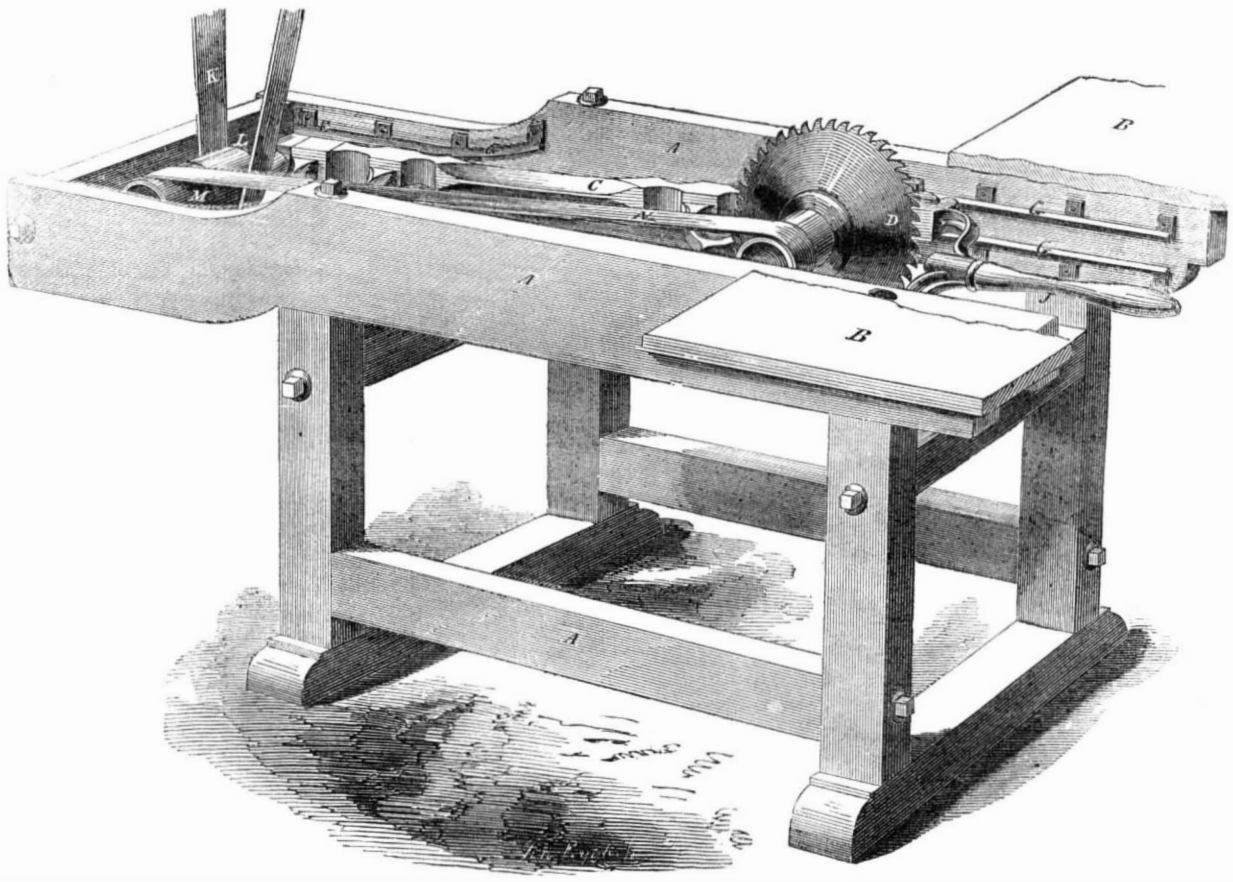
When the making and breaking of the primary circuit is effected by the hand, by bringing the wires into contact, and then separating them quickly, the stronger the wires are pressed together before separation, and the more suddenly they are separated, the greater are the sparks which cross at the ends of the induction coil. It is just the same with the contact and separation of the platinum point and plate. The largest sparks are obtained when the spiral spring is in a state of the strongest tension, and the iron armature is not permitted to come too near to the electro-magnet, for a portion of the force would be thus neutralized with which the lever is pressed by the spiral spring against the platinum plate.

By the use of the three screws, H L K, this relation can be altered at pleasure, and the play of the lever also permitted to proceed more slowly or quickly.

Two small bars of steel move in the front stands, which are insulated by glass pillars. The bars are furnished at the hinder extremities with disks of brass, and at the forward extremities with platinum points. They may be caused to approach each other up to contact, and they can be diverted so that a point shall stand opposite a disk, or both disks opposite to each other. In addition to the conducting wires which proceed from the induction coils, several wires for the passage of the current for other purposes may be attached to the discharger.

In the drawer, M, is a wax cloth condenser, built into layers, separated from each other by varnished partitions, and connected with the binding screws which stand in front. By this apparatus the most powerful and brilliant sparks have been obtained. By placing a piece of sugar, chalk, or wood between the two points on the front stands, the play of sparks is beautiful, and they ignite gunpowder, paper, and cotton wool. By the use of a Bunsen battery of two cells in connection with this apparatus, very long sparks are given off

BROUGHTON'S CROSS-CUT SAW.



The accompanying figure is a perspective view of an improvement in cross-cutting circular saws, for which a patent was issued to John Broughton, (formerly of Chicago, now of this city,) on the 22nd of July, last year. The feed bed in this machine is stationary, and the saw is fed forward to the board in a sliding frame, avoiding the friction of the railway cross-cut saw, and providing an ingenious and simple method of keeping the driving belt taut, while the saw is moving forward.

A is the frame of the machine; B is the table made of single plank, on which the stuff or lumber is placed to be cut by the saw, D, Part of this table is left off, to show the handle by which the saw frame is moved, as the table is secured on the top of the frame, in front of the saw. C is a light sliding jointed frame, in the front end of which the saw, D, is hung; and at its back end, the arbor carrying the pulleys, L M, the latter receiving motion by belt, K, from a main driver pulley above. The belt, N, drives the saw shaft. The journals of the saw shaft, and those of the pulley arbor, have their bearings in anti-friction sliding boxes, which are placed in the straight guide ways, G G, in front for the saw, and the curved guide ways, E G, at the back, for the pulley arbor. The handle, J, is attached to the sliding frame, C, in front, and by it the saw, with its frame, is directed forward and back by the attendant.

A plank to be cross-cut, being laid upon table, B, in front of the saw path, the operator takes hold of the handle, J, under the table, and draws the sliding frame, C, with its saw and driving pulleys forward, and thus cuts through the plank—the journal boxes of the saw shaft and the pulley arbor being guided in their respective ways—the frame, C, accommodating itself to the position of the pulleys, L M, and the saw arbor. When the plank is cut off, by simply giving handle J a slight touch backward, and letting it go, the sliding frame, C, with its saw and adjuncts, slides back to its former position, to allow the plank to be set for another cut. The sliding frame is nicely adjusted and balanced, and the form of the back guide ways allow it to be assisted in moving backwards by its own gravitation. Owing to the form of the two guide ways being different—the one for the saw shaft being straight, and that for the pulley arbor of the form of an arc, while the saw and its shaft moves forward in a horizontal line, the arbor and pulleys on the back end of the frame, move in an arc which is a portion of a circle, whose center is at the shaft of the driving pulley above, from which belt K derives motion ; therefore, as the saw frame is drawn forward, the belt, K, will always be kept taut.

These cross-cutting saws are very useful for car builders, cabinet-makers, and workers in wood generally. This machine has no friction pulleys or hanger, it drives the saw in the simplest and strongest manner by the belts passing around the actual driving pulleys only. The ease and facility with which it is operated, admits of a great amount of work being done, and it will always cut off plank, boards, door rails, panels, &c., perfectly square and true. The whole of the working parts are before the eye of the operator, and very accessible for the purpose of oiling and the examination of any part that requires his attention. The weight of the pulleys, L M, and the frame, C, hanging in belt K, gives proper tension to the belt without friction or excessive tightening pulleys. The grooved guide ways prevent lateral motion, and keep the frame steady and smooth in its action. One of these machines has been in operation in Chicago, Ill., for a year and a half ; during this test it has won its way into favor, supplanting the common railway cross-cut saw, on account of its greater simplicity and ease of operation.

One of these machines may be seen in operation in Room No. 31, in the building of the New York and New Haven Railroad Depot, corner of Center and Franklin streets, this city. where these machines are manufactured by Broughton & Fraser, to whom communications requesting more information should be addressed.

© 1857 SCIENTIFIC AMERICAN, INC.

Scientific American.

NEW YORK, MARCH 7, 1857.

A NEW HALF YEAR.

The time has arrived for those who have been waiting a good opportunity to enter their names as subscribers to the SCIENTIFIC AMERICAN The present number of our paper closes the first portion of the present volume, and opens a new half year. Now is the time to subscribe.

The terms of our paper, it will be remembered, are $2 a-year, or $1 for six months. Many of our friends who subscribed for the first half of the year, are now called upon to renew their subscriptions for the balance of the volume. By an early remittance they will secure themselves against the loss of any numbers, and thus have the same complete at the end of the year.

No publication in this country presents so much and such a varied stock of useful and valuable information, upon the subjects pertaining to its peculiar sphere, as the SCIENTIFIC AMERICAN. Every person, whether old or young, will derive benefit from a study of its columns.

Dr. Kane, the Arctic Explorer.

This intrepid explorer closed his life on the 16th ult. in the city of Havana, Cuba, to which place he had gone in search of health. He was a native of Philadelphia, in which city he was born in February, 1822, and therefore was only 35 years of age at the time of his decease; but in his brief life he had lived for some purpose.

He early distinguished himself for adventure, and scientific investigation of natural subjects. He graduated from the University of Pennsylvania in 1843, at 21 years of age and was familiar with chemistry, geology, mineralogy, astronomy, surgery, medicine, and the classics.

Although naturally of a weak frame and a delicate constitution, his daring spirit enabled him to accomplish feats of personal endurance from which stronger men would have shrunk appalled. He was appointed on the Diplomatic Staff of the first American Embassy to China, as assistant surgeon. This position gave him opportunities for the gratification of his passion for witnessing new scenes. He went successively through the accessible portions of China, Ceylon, and the Phillippines, and also India. In the island of Luzon—one of the Phillippine group—he descended into the crater of Tael, suspended by a bamboo rope from a crag which projected two hundred feet above the interior. The natives looked upon this as a daring feat, and declared that he was the first white man who had ever attempted it. The Doctor suffered by his exposure to the gases of the crater, but remained below until he had made a sketch of the interior. He ascended the Himalaya mountains, visited Egypt, and went to the Upper Nile, where he made the acquaintance of Lepsius, who was at that time prosecuting his archæological researches. Obtaining his discharge from the Embassy, he returned home by way of Greece, which country he traversed on foot, and reached the United States, after a brief sojourn in Europe, in the year 1846.

When the Mexican War broke out he requested to be engaged in active service, but the War Department sent him on an expedition to the coast of Africa, when he took the fever, from the effects of which he never fully recovered. When he returned in 1847, he was sent to Mexico with dispatches of great importance to General Scott. He did not make his way unscathed through the enemy's country, but was wounded, and had his horse killed under him in a sharp skirmish. He remained in Mexico until the close of the campaign, and when he returned was detailed for service on the Coast Survey, and continued in that employment for a considerable time. His varied acquirements made him a most useful member of that important corps.

These travels, expeditions, feats, and services show what kind of spirit Dr. Elisha Kent Kane possessed, but his fame chiefly rests upon what he accomplished as an explorer in the Arctic regions.

He was appointed Surgeon of the U. S. brig *Advance*, in the expedition sent out in May, 1850, in search of Sir John Franklin, under Lieut. DeHaven. This expedition returned in September, 1851, having been absent one year and four months. Dr. Kane prosecuted his scientific researches during the time the expedition remained in the Arctic seas, and on his return embodied in a "Personal Narrative' a digest of the cruise.

The results of this first expedition, although it failed in its real objects, yet it encouraged hopes that definite tidings would ultimately be received from Franklin's expedition. Early in the year 1852, a letter was addressed by Lady Franklin to the President of the United States, in which the highest commendation was bestowed upon the American expedition, and the aid of our government again solicited. The appeal was not permitted to pass unheeded, and the *Advance* was now placed at the disposal of Dr. Kane himself. In December, 1852, he received orders to conduct the new expedition, and sailed from this port on the 31st of May, 1853. Through the liberality of Mr. Henry Grinnell, of this city, aided by Mr. George Peabody, our countryman in London, the brig received a perfect outfit. The expedition pushed northward with rapidity; but the vessel was soon stopped in its further progress by great fields of ice, in which it was completely locked, without the least prospect of ever being extricated. Patiently did the whole members of the expedition wait for many weary months in this situation, but at last all hope fled; and finding it impossible to clear the vessel, Dr. Kane came to the determination to forsake her, and did so on the 24th of May, 1855. The party took from the brig the necessary provisions, documents, instruments, &c., and placed them on sledges and in boats; these were dragged over the ice with incredible difficulty, for a distance of three hundred miles. Then, having reached the sea, the party took to the open boats, and made the best of their way for a distance of 1,300 miles, to the Danish settlement of Upernavik, in Greenland, where they were hospitably received.

The great fruit of this expedition (although it accomplished nothing relating to Sir John Franklin,) was the discovery of an open Polar Sea further north than the impenetrable ice fields. Such a sea had been supposed to exist, now its existance was demonstrated.

As no word had been heard of this expedition for more than a year, it had almost been given up for lost. It was supposed that some great accident had befallen it; that the vessel had been crushed in the ice, and that the party, or some of its members, had perhaps escaped to the wild, inhospitable Arctic coasts, from which they never could return unless help were sent to them. Representations were made to Congress, urging the duty of instituting a search for the missing party, the result of which was an appropriation and the detail of the *Arctic* and *Resolute*, propellers, under the command of Lieutenant Hartstene, for the prosecution of a search. This expedition sailed from New York in April, 1855, and on the 13th of the following September fell in with Dr. Kane's party, at Disko Island, 250 miles south of Upernavik. They had taken refuge on board a Danish trading vessel, for the arrival of which they waited at the port for several weeks, in order to proceed to England. This unexpected meeting was of the most thrilling character. The American sailors manned the rigging of the *Arctic* and *Release*, and with almost frantic cheers "welcomed Dr. Kane back to the social world which they represented."

On the evening of Thursday, Oct. 11, 1855, it was announced in New York that the searching expedition had returned with Dr. Kane and his party. This caused intense excitement, and the whole party were greeted with an eager welcome.

Soon after this Dr. Kane commenced the preparation of his narrative, which has been published under the title of "Arctic Explorations." In November last, having completed this task, he sailed for Europe, and on arriving in England was at once received with a cordial welcome. He, however, declined all public honors, and appeared but very little in public.

The hardships which he had endured told severely upon his feeble frame, and his health continued to decline. He was then advised to seek a more genial clime, and sailed in the early part of winter to Havana; but his cup of life was nearly full, and now "the golden bowl is broken."

Dr. Kane was retiring and unostentatious; he had confidence in himself, but was never obtrusive. He was prudent, energetic, and amiable, and possessed the quality of deeply attaching friends to him. His narratives of his two Arctic voyages have had a wide circulation. They are written in a vigorous and manly style, and illustrated with many beautiful plates. They will bear down to other generations the records of his toils, attainments, and discoveries.

When the death of Dr. Kane was made public in Havana on the 17th ult., a thrill of grief pervaded all classes. His countrymen and the city authorities followed his remains on board the steamer *Catawba*, and the Governor of the city pronounced a touching oration over his bier.

Artesian Wells for all Situations.

A province of France called Artois, is famous for a peculiar construction of well, a hole either slender from its commencement at the surface, or a well dug in the ordinary manner to a considerable depth, and then continued by a small boring until the water is struck and rises. Slender borings have been made for water from a very early period, but the success of this practice in that locality has given the name of "Artesian" to all deeply bored wells of modern date. Generally such efforts are conducted in valleys where a dense stratum overlays springs which once penetrated would rise and flow over freely at the top. In some cases considerable rivulets still continue to flow from the mouths of abandoned wells of this character.

Sometimes these wells have been driven to almost incredible depths, passing springs of trifling power at various points on the way. The Artesian well completed a few years since at Grenelle, near Paris, is 1,800 feet deep, and the imprisoned water, on being tapped, rose with prodigious force, and overflowed the surface in immense quantities. The Chinese have many wells only five or six inches in diameter, and from 1,500 to 1,800 feet deep. According to Abbe Imbert, a French missionary, some of them must be 3,000 feet deep. Some wells in our own country have been driven to great depths with every variety of success. A hole two or three inches in diameter was bored many years ago to the depth of about 650 feet, on, or very near the site of the United States Hotel, in this city, and then abandoned as a failure. Borings at and near New Brunswick, N. J., have been sunk to depths of from 250 to 800 feet, and obtained, on the contrary, liberal overflows of pure water. Probably the deepest well in our country is a boring at Belcher & Brothers, in St. Louis, Mo., which in 1854 had been carried to a depth of 2,350 feet, or nearly half a mile, without any satisfactory result.

Borings of less than about four inches in diameter are now considered inexpedient, as they afford so much less room for the tools. Rock is preferred to loose earth, but the latter is readily worked by enclosing the bore in a cast iron pipe with flush joints, which is crowded down as the work progresses. Thus whatever the springs on the intermediate levels, the water is all drawn from the bottom alone. Such iron-lined wells are usually about twenty inches, or from that to six feet in diameter, and as the metal does not sensibly corrode, such tubes may be considered perforations destined to supply for all coming time a constant stream of pure spring water of the greatest coolness, gushing freely from depths too great to be affected by droughts.

The above is doubtless familiar to most of our readers, but it may not be so generally known that precisely similar borings are practicable, and are employed with great advantage in connection with pumps, at localities where the water will not rise to the surface. The well water of this city, for example, is decidedly bad, we mean that from common wells; but borings sunk to the rock in any of the lower wards gives water at a uniform temperature of 52° Fah., and so far preferable to Croton for drinking purposes that one has been sunk to supply the International Hotel and Saloon, this city, an establishment which under the more familiar name of "Taylors," is known as the most expensively furnished in America.

Our metropolis, like the house in the parable, stands on a rock, a great formation, which appears in ledges at Hurl Gate and Diamond Reef, and crops out plentifully in the upper part of the city, but is in most of the settled portions covered with loose earth. The thickness of these latter deposits is from 70 to 150 feet, and in the gravelly beds immediately overlieing this rock, water is sometimes not only excellent but plentiful.

Some sugar refineries and breweries in this city are supplied from Artesian wells with quantities of water which would cost, if drawn from the Croton pipes, nearly $5,000 each per year, or twice the cost of a single well, if the Croton were capable of furnishing them, which it is not without robbing the citizens. The boring and tubing complete is contracted for at about $30 per foot, making the cost of a well 80 feet deep $2,400.

It should be remarked that the water, although received from a gravelly bed at a great depth, does not necessarily have to be elevated the whole distance therefrom by pumping. On the contrary, it may, as we have seen, rise and flow over, and always rises a greater or less distance toward the surface according to the elevation of the place, dip of the strata, etc.

At Messrs. Harris & Coon's sugar refinery, Leonard street, this city, there are two of these wells only fifteen feet apart, and each twenty inches inside diameter. The water during the night stands at only about 10 feet below the cellar floor, but while being pumped the surface is reduced some 10 feet lower, where it stands firm. Four double-acting pumps, each 6 or 7 inches in diameter, and varying from 14 to 18 inches in stroke, are constantly employed, and make about 25 double strokes per minute, so that the quantity drawn from these two wells must be about 46 cubic feet, or 350 gallons per minute.

There are comparatively few situations where overflowing wells can be established, but it would seem that deep borings to be pumped from might be made with advantage in a far greater, if not in every variety of situations. Unforseen circumstances, however, may defeat the success of an enterprise of this nature in a section of almost any geological character.

There are several parties who make it their business to construct these wells, and who will, no doubt, cheerfully furnish manufacturers or others any additional information or estimates which may be required. One is now being sunk in the sidewalk in front of a sugar refinery in Washington st., near Canal, which has already reached the depth of 98 feet. This work is done by Mr. G. N. Bolls, of Philadelphia.

Mr. John Disbrow, of Haverstraw, N. Y., is the only Artesian well-sinker within our acquaintance in this vicinity, and to him we refer any persons who may wish to inquire further. He was the first, we think, to increase the size of borings above a very few inches.

West India Sugar Cane.

The U. S. Store-ship *Release*, sent to the West India Islands to obtain specimens of sugar cane cuttings, to be distributed among the Louisiana planters, and which is now in New Orleans. No less than 1000 boxes of cuttings weighing 30 tuns. In Demarara the sugar cane was found growing 4,500 feet above the level of the sea, and was quite thrifty. The cuttings obtained are stated to have been selected with great care. This is one side of the story. Another account, which we have read in a cotemporary, asserts:—"A great deal of disappointment is felt and expressed by the sugar planters in relation to the cane cuttings brought by the *Release*. A large proportion of the cane is pronounced perfectly worthless, and it is said there are traces of the borer in the cuttings."

© 1857 SCIENTIFIC AMERICAN, INC.

More Useful Information respecting Steam Boilers.

Notwithstanding all that has been said on this subject, it seems to excite continual interest, because it is a question which concerns so many persons. While a fatal disease rages in the community, excitement remains unabated, and as long as boiler explosions occur they will excite interest. The subject is of such vast consequence in our country that officers are appointed by government to carry out laws for the safety of human life; and in England, a most powerful voluntary association has been formed for the same purpose. We recently gave a condensed summary of the Report for 1856, of our American Inspectors, and we will now present a like review of the Association in England.

Its headquarters is in Manchester, England, where it originated. Its members subscribe a certain sum annually, and employ competent Inspectors to examine and report on the condition of their boilers. At the close of 1856, this Association had under its care 1,456 boilers, and had made 2,246 visits of inspection in the course of the year. No explosion has occurred to any of these boilers, but 143 of them have been found in a dangerous state from corrosion of the plates, inoperative and inefficient safety valves, defective gauges, and deficiency of water. Corrosion of plates is attributed, in one case, to the use of water containing acid, such as that obtained from stagnant pools containing decaying vegetable matter. The remedy suggested for this, when no other kind of water can be obtained, is some potash or soda, put from time to time into the boiler. Dampness from leaks also causes corrosion in the seating of boilers.

Circulation.—On this head the Report of Inspector Longridge contains much original and useful information. It says:—

"From a careful investigation of the subject I have been led to the conclusion that, in the majority of cases, leakage and fracture of the plates at the underside of a boiler originate from imperfect circulation of the water. In no boiler that I have yet seen have any means been adopted to promote circulation, and we find that, whatever be the construction of boiler, failures of this kind occur to a greater or less extent where the pressure is considerable. In multi-tubular boilers, where the greatest heat exists in the upper rows of tubes, the water at the bottom remains comparatively cool and undisturbed, and, as is well known, these boilers are especially liable to leakage. In flued boilers, with furnaces in the flues, it is no uncommon occurrence to find one of the seams on the underside, about the middle of the boiler, fractured between the rivet holes throughout a considerable portion of the semi-circumference. In first raising steam from hot water, it is well known that the steam may be up and the temperature in the upper part of the boiler very considerable, while at the underside the water and the plates remain quite cool, which could not be the case with good circulation. Cylindrical boilers, with external furnaces, are affected from the same cause, though somewhat in a different manner.''

Many boilers were found to be fractured for want of proper circulation. The mode of remedying these evils which he suggests, is to "fix in the boiler sheets of iron to separate the ascending and descending currents; or where this cannot be arranged for want of space, to convey a large pipe, communicating with the upper part of the water, underneath or within the boiler, with several branch pipes to supply water for the ascending current. The advantage to be derived from attention to circulation would not be confined to the durability of the boiler, but would also greatly contribute to an increased evaporation of water, and I know of no point connected with the construction of boilers more deserving the attention of the engineers."

This is a point which, within a few years, has attracted considerable attention in this country, and inventions have been brought forward in which the circulation of the water was a principal, in fact the only peculiar feature. But it has been pretty generally concluded inexpedient to insert plates or partitions for the express purpose, as all such additions, by forming nuclei for scale and incrustation, may do far more harm than good. But our boiler makers have modified their proportions materially to this end, and in the tubular boiler, for example, place their tubes at a considerably greater distance apart, so that greater opportunity is afforded for a free descent of water in an open space at the sides of the shell, to rise mingled with steam through the spaces in the middle. One principal object attained by the peculiar construction of the Martin patent marine boiler, now almost universally employed on all our new steamships, whether merchant or naval, is the active circulation of the water, but the efficiency of the heat in raising steam, and the durability of the parts is found to be quite sensibly increased.

Low Water and Heated Flues.—There was one peculiar case which occurred with a cylindrical boiler. It connected with two others, having the fires in the flues, and had been placed considerably higher than the latter on account of convenience in firing, and on the occasion referred to it appears that, owing to the valve in the feed pipe not having been perfectly tight, the water had escaped into the other boilers, till an equality of level was established, leaving the flue of the higher boiler partially uncovered. The fireman, on finding the water too low, opened the feed-valve to admit more, when almost instantaneously, the flue collapsed with a loud report. On examining this boiler a few days after, there was a distinct line, showing that the upper part of the flue had been uncovered by water, but there was no appearance of its having been red hot. The temperature, however, had been sufficient to surcharge the steam, which the moment before the accident did not exceed 8 lbs. pressure.

To provide against this danger, Mr. Longridge recommends "every boiler to be provided with efficient fusible plugs or safety valves connected with floats, either of which should be arranged to come into operation and allow the escape of steam before the water could reach a dangerous level. Where, however, a boiler is already in danger from this cause, the best course to be pursued is to draw or damp the fire, and then leave the boiler to cool, carefully avoiding any measures which might cause agitation of the water, such as starting the engine or opening any of the valves."

The Kind of Boilers.—The majority of the boilers employed in the Manchester District are of the Cornish or flued construction, and because they are stronger than the old wagon boilers, and can carry high pressure, they have superseded them, but they are not so strong as plain cylindrical boilers; they are preferred because of their superior economy in generating steam.

"The weakest points in these boilers," the Report says, "as is well known, are the flues, which, in case of deficiency of water, are very liable to collapse. It has not been satisfactorily ascertained what pressure such flues are capable of sustaining, but by some late experiments it has been proved that the strength of cylindrical vessels subjected to external pressure is in the inverse proportion to their length, a fact which seems hitherto to have been unknown, or at any rate disregarded. It seems, on this account, advisable in high pressure boilers of this construction, to strengthen the internal flues, if of considerable length, by external rings of T, or angle iron."

This is a point to which we wish to direct the attention of our boiler makers and engineers, because it is one respecting which all are somewhat in the dark.

"The cylindrical boilers without internal flues, though well adapted to high pressure, do not contrast favorably with flued boilers, in economy of fuel. The multiflued boilers are much approved of by many, but multitubular boilers are the most economical, though hitherto the necessity of frequent repairs has brought them into disrepute. One objection frequently urged against this description of boiler is the difficulty of removing incrustation from the tubes. In regard to the evaporating power of boilers our present knowledge is very imperfect. The true tests of the merits of a boiler is the weight of water evaporated per pound of coal under a given pressure and in a given time, which can be ascertained by means of an accurate water meter."

This Report contains some very useful information relating to different kinds of engines, and the use of steam at different pressures. In our next number we will take up and discuss this part of it.

Writing Paper.—The Best Colors.

Those who are in the habit of writing during evening hours, under artificial light, are aware of the fact that the eyes often suffer from looking upon the white paper. A partial remedy for this evil is the use of light blue colored paper, which is manufactured in great abundance. All our artificial light—that of oil, gas, candles, and any common hydro-carbon—has a yellow tinge, which color excites the retina more than any other in the spectrum. As blue and yellow form a green color when combined—the most agreeable to the eye under bright lights—the benefit of light blue paper to write upon during night hours becomes apparent. The yellow rays of the artificial light strike upon the light blue paper, and mingling with the blue, reflect light green rays to the eyes. All paper, therefore, for writing upon under artificial light, should be of a very light blue color.

The writing paper to be employed by those who have inflamed and tender eyes under bright sunlight, instead of being colored blue, as we have seen recommended in some medical works, should be of a light green color, because the sun's rays are pure white, and such paper will reflect light green rays to the eye from the white solar rays falling upon it. Under no condition, however, should those who have strong and healthy eyes use any kind of paper but white. If writing in a room under bright sunlight they can tone the intensity of the rays with a white screen or other shade, and thus admit subdued white light. There are many persons, however, to whom light green paper would be of great benefit, and as very little writing paper of this color is manufactured—white and blue being the common kinds—we would suggest to our paper makers, the manufacture of more light green paper. It should take the place of that dirty yellow colored paper so commonly used in the manufacture of envelopes, &c. Common thick, but well glazed smooth wrapping paper colored green might be economically employed by many persons. All that is required to produce this kind of paper is to mix some blue coloring agent with a proper yellow coloring agent.

The common extract of indigo sold by dealers in chemicals, and a yellow fustic liquor, will color paper a good light green. These two coloring agents, in proper proportions, may be mixed with the paper pulp in the "engine." To insure the action of the indigo, one ounce of the acetate of lead dissolved in warm water should be added when cold, to 1 lb. of indigo, and the solution allowed to stand two or three hours before it is used.

We have no doubt but the foregoing suggestions, if carried out, will be the means of doing much good to a great number of persons.

Stamping Patented Articles.

Although we have on two former occasions, presented our views respecting the meaning of the patent law, as it relates to *the date* on patented articles, we still receive communications in which information on the subject is requested. We suppose that most of these letters come from new subscribers who have not had and cannot have the opportunity of reading the articles referred to. In view of these facts, and some others of a peculiar character, relating to this question, we deem it necessary to bring it again before our readers.

One of the letters to which we have alluded reads as follows:—"Is it absolutely necessary that the date of a patent—both month and year—and also the word *patent*, should be stamped on every article, however small? Or will it answer the claims of the law to mark thus the packages containing these articles? Some articles are so small that it is very inconvenient and almost impossible to stamp them separately." It is indeed very difficult to mark the date of a patent on many articles, on account of their minuteness, but it is not only necessary, to stamp or mark the month, year, and word *patent* on every article for which a patent has been granted, but the *day* also. The law relating to this point came into effect on the 29th August, 1842. It says (section 6): "*And be it further enacted*, That all patentees and assignees of patents hereafter granted, are hereby required to stamp, engrave, or cause to be stamped or engraved, on *each article* vended or *offered* for sale, the *date* of the patent; and if any person, patentees, or assignees, shall neglect to do so, he or she shall be liable to the same penalty, to be disposed of as specified in the fifth section of the same act." The penalty for non-compliance with the law is one hundred dollars, with costs, to be recovered by action in any Circuit Court of the United States.

Now, what is the meaning of the term *date*? Evidently the *day* on which an instrument is signed. We have no other meaning for the word as it relates to patents, because it refers to the day, the month, and year on which the patent is signed.

In the month of May, last year, a suit was brought against a manufacturer in this city, for selling patent pen-holders which were merely stamped with the year (1850) on which the patent for them was issued. The ruling of the Court in that case was, that each patented article required to be stamped or engraved with the date of the patent—day month, and year; but the plaintiffs failed to make out a case as to the articles offered for sale.

For want of a correct understanding of this law, or on account of the smallness of the articles patented and the difficulty of stamping them, hundreds of patentees have not complied with the *letter* of the law, although they have, in our opinion, with its spirit and object. The object of the law is to prevent persons from deceiving the public.

In every community there are always some human jackals and hounds, and we understand that there are a number of such who prowl about this city, endeavoring to find out patented articles on which the date is not sufficiently stamped, for the purpose of levying "black-mail" upon the unsuspecting patentees, assignees, or persons offering them for sale. When they see a patented article which has not the *day* of the patent's issue stamped upon it, an accomplice endeavors to have it offered to him for sale. When sufficient testimony to this effect is secured, notice is given of a suit to be commenced against the party offending, and a tremendous bill of liabilities—one hundred dollars for each article is something of a scarecrow—and costs, is presented to the mind. The law being so apparently pointed against the party offering the article for sale, it is generally concluded to pay a bonus—throw a bite into the hounds' jaws to stop their barking. We would treat every attempt to levy "black mail" in this manner with contempt. While we rejoice to see those who stamp the word "patent" on unpatented articles offered for sale, fined and punished for their plain attempt to deceive the public, we have very different feelings towards an honest but mistaken patentee who has not fully complied with the letter of the law.

We advise all patentees to stamp or engrave their names together with the *ex act date* of the patent on each article offered for sale, to prevent the possibility of being annoyed, but, at the same time, from a thorough examination of the statute, we are of opinion that every person who brings a suit of this kind against another, is bound, according to section 5 of the Act referred to, to prove "intent to deceive the public" on the part of the defendant. Resting on this foundation, every honest patentee will find full security in the law, and he may snap his fingers at every "black-mail" jackall that growls at him.

The Dudley Observatory.

The Albany papers state that this institution will be in working order some time this spring. The amount expended thus far for the Observatory is about $75,000. The permanent fund for the support of the institution exceeds $75,000 more. A calculating machine ordered to be constructed in Sweden is expected to arrive this month.

© 1857 SCIENTIFIC AMERICAN, INC.

W A. A., of Pa.—Ingredients employed in a composition can be used apart from the particular patented process. Patents are not granted upon simple ingredients.

E. M. R., of Pa.—In No. 9, Vol. 7, Sci. Am,, you will find a full description of Dr. Page's Electro-Magnetic Engine, to which we refer you for such information as you want in regard to it.

J. E., of Pa.—We have not sufficient information in regard to the sewing machine you mention to venture an opinion. It must be thoroughly tested.

D. D. N., of Tenn.—For the information you want in regard to portable saw mills, we advise you to correspond with H. Wells & Co., Florence, Mass.

W. H. B., of N.Y.—We are not acquainted with a single work of any consequence on pattern-making.

G W. W., of Pa.—There is no Manual of Inventions published but that of Beckman, excepting a small volume entitled "History of Wonderful Inventions," by Harper & Bro.

J. C., of Conn.—B. Woodcock has procured four separate patents on plows. Three have expired, but the fourth will not expire until 1859.

G W., of Pa.—If you will furnish us with your proper address, we will send you one of our circulars of information. There can be no good reason for disguising your name.

T. B. K., of Me.—You have not been a careful reader of the Scientific American or you would have learned before this time that lightning runs up a tree with the same facility that it runs down ; in other words, electricity ascends from the earth to the clouds as often as it descends from the clouds to the earth.

M. M. C., of Ala.—We have transmitted your letter to Mr. Paige, at Baltimore, Md.. with a request that he will answer your inquiries concerning his patent saw mills.

P. H. W., of Ill.—The bars of iron, car axles, etc., of English manufacture, tied in knots, exhibited in the Crystal Palace in 1853, excited the same attention in mechanical circles here at the time, but the general conclusion was that they were designed as imposition. They may have been *bent* cold, (which was all that was absolutely claimed on their labels,) but were never tied in such knots except at a good bright heat.

S. B. P., of N. Y.—An electro-magnetic engine to work a small foot lathe can be made and depended upon, but we do not advise you to get one. Pike & Sons, this city manufacture small ones.

C. R. F., of Pa.—Our personal experience leads us to believe that more water passes through an orifice of a given size during night than during the day. In this opinion we agree with the millers to whom you refer.

A. W., of Ill —We would prefer to use an engine of 12 inch bore and 20 inch. stroke to one of 10 inch bore and 24 inch stroke in running a circular saw ; but if there is any difference in their economy it must be with the long stroke.

G. J., of Pa.—We are not acquainted with a single work on steam boilers that points out a difference of temperature (and how much that is) of the steam at different parts of a horizontal boiler. The temperature of the steam is according to the pressure, and must be about equal in all parts of a boiler ; the difference, if any, must be small. We do not believe that water ever assumes the spheroidal condition in a boiler unless the plates become red-hot.

E. W., of Wis.—We do not know the price of Ewbank's Hydraulics. D'Aubuisson's Hydraulics, published by Littell & Brown, Boston, is a good work. We do not know its price.

Benjamin Wright and John Bean, of Hudson, Mich., are informed that both of their patents have been obtained—notwithstanding their former rejection—and the documents are in our possession, with others, awaiting their orders how to have them transmitted.

D. F., of N. J.—Your plan for inserting a mirror inside of the cover of prayer-books, hymn-books, etc., for the benefit of church-going ladies is a novel idea, but we question the propriety of allowing our fair sex the opportunity of admiring themselves during church service.—Perhaps, however, it might be considered a useful invention, as such ladies as would use the article are not of the class that would be likely to be much benefitted by the preaching, and if they had an opportunity of admiring themselves they would be less likely to examine and criticise other's dress, therefore we conclude you have an invention of utility.

L. G. K., of ——.—We do not believe that the idea of working the rake fingers through slots in the platform is covered by patent, so as to prevent you from using the slotted platform and working the teeth in an entirely different way.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Feb. 28, 1857 :—

S. S. C., of N. H., $120 ; H. S. Jr., of N. Y., $30 ; W. J., of Tenn., $26 ; J. G. Jr., of Mass., $25 ; S. D. L., of Mass., $25 ; J. C., of N. J., $30 , G. W. S., of Conn., $20 ; R. H , of Vt., $55 ; J. B., of R. I., $25 ; M. C. R., of O., $35 ; E. B., of N. Y., $20 ; W. M. Mt. S., of N. Y., $100 ; M. S. F., of Mich., $15 ; J. B., of La., $30 ; R. G. S., of Ill., $30; J. P., of N. J., $200 ; H. B., of N. Y., $10 ; C. F. H., of Conn., $30 ; T. W. Jr., of Conn., $2 ; R. W. T., of N. Y., $30 ; W. & E., of Del., $30 ; W. H. S., of N. J., $55 ; R. W., of Mass., $25 ; C. C. A., of Min. Ter., $30 ; E. G. C., of N. Y., $30 ; O. J., of N. J., $30 : T. J. L., of Pa., $30 ; C. O. L., of Vt., $55 ; W. B., of N. J., $25 ; J. P. R., of Pa., $40 ; L. & B., of Me., $25 ; H. D. F., of Mass., $25 ; S. A., of Pa., $55 ; T. V., of Cal., $20 ; J. M., of Ind., $126 ; B. S., of N. Y., $25 ; H. & F., of N. Y., $30 ; W. S. H., of N. Y., $25 ; H. W., of N. Y., $25 ; W. M., of N. Y., $14 ; G. H. C., of R. I., $55.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Feb. 28, 1857 :

W. J., of Tenn. ; J. G., Jr., of Mass. ; C. H. E., of Wis;; S. D. L., of Mass. ; G. W. S., of Conn. ; J. B., of R. I. ; B. S., of N. Y. ; E. B., of N. Y. ; H. & E., of N. Y. ; J. P. S. of N. Y. ; H. D. F., of Mass. ; W. B., of N. J. ; R. E. S., of N. Y. ; J. G., of Pa. ; W. S. H., of N. Y. ; R. W., of Mass. ; H. W., of N. Y. ; D. M. C., of O. ; J. H., of Ind.. L. & B., of Me. ; W. M., of N. Y. ; D. & M., of Cal. ; G, H. C., of R. I.

Important Items.

☞Complete Sets of Volume XII Exhausted.—We regret that we are no longer able to furnish complete sets of the present volume. All the back numbers previous to January 1st (No. 17) are entirely exhausted.

Give Intelligible Directions—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post office at which they wish to receive their paper, and the State in which the post office is located.

Foreign Subscribers—Our Canada and Nova Scotia patrons are solicited to compete with our citizens for the valuable prizes offered on the next volume. [It is important that all who reside out of the States should remember to send 25 cents additional to the published rates for each yearly subscriber—that amount we are obliged to pre-pay on postage.]

Patent Laws and Guide to Inventors.—This pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office. Price 12 1-2 cents per copy. A Circular, giving instructions to inventors in regard to the size and proper construction of their models with other useful information to an applicant for a patent, is furnished gratis at this office upon application by mail.

Receipts—When money is paid at the office for subscription, a receipt for it will always be given ; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgment of the receipt of their funds.

Patent Claims—Persons desiring the claim of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office stating the name of the patentee, and date of patent when known, and enclosing $1 as fee for copying.

Terms of Advertising.

Twenty-five cents a line each insertion. We respectfully request that our patrons will make their advertisements as short as possible. Engravings cannot be admitted into the advertising columns.

☞ All advertisements must be paid for before inserting.

IMPORTANT TO INVENTORS.

THE UNDERSIGNED having had Eleven years' practical experience in soliciting PATENTS in this and foreign countries, beg to give notice that they continue to offer their services to all who may desire to secure Patents at home or abroad.

Over *three thousand* Letters Patent have been issued, whose papers were prepared at this Office, and on an average *fifteen*, or *one-third* of all the Patents issued each week, are on cases which are prepared at our Agency.

An able corps of Engineers, Examiners, Draughtsmen, and Specification writers are in constant employment, which renders us able to prepare applications on the shortest notice, while the experience of a long practice, and facilities which few others possess, we are able to give the most correct counsels to inventors in regard to the patentability of inventions placed before us for examination.

Private consultations respecting the patentability of inventions are held free of charge, with inventors, at our office, from 9 A. M., until 4 P. M. Parties residing at a distance are informed that it is generally unnecessary for them to incur the expense of attending in person, as all the steps necessary to secure a patent can be arranged by letter. A rough sketch and description of the improvement should be first forwarded, which we will examine and give an opinion as to patentability, without charge. Models and fees can be sent with safety from any part of the country by express. In this respect New York is more accessible than any other city in our country.

Circulars of information will be sent free of postage to any one wishing to learn the preliminary steps towards making an application.

In addition to the advantages which the long experience and great success of our firm in obtaining patents present to inventors, they are informed that all inventions patented through our establishment, are noticed, *at the proper time*, in the Scientific American. This paper is read by not less than 100,000 persons every week, and enjoys a very wide spread and substantial influence.

Most of the patents obtained by Americans in foreign countries are secured through us ; while it is well known that a very large proportion of all the patents applied for in the U. S., go through our agency.

MUNN & CO.

American and Foreign Patent Attornies, Principal Office 128 Fulton street, New York.

SAWYER'S COMPANION—"Mr. S. E. Parsons, Wilkesbarre, Pa. Sir : The perusal of your "Sawyer's Companion lately received through Messrs. Munn & Co., N. Y., has impressed me with a very high value of its merits. Though there are many things which I do not exactly understand, yet your book makes clear many difficulties which I had observed in my own circular saw mill, and when explaining the causes of defects, prescribes the cure ; and to one situated as I am, I may say that the information is invaluable. Please accept my thanks. John C. Potts, Wedgeford, Thibadoux, La." This book is for sale at the Scientific American Office. Price $1·00. 1*

THE FIRST OPENING OF THE NEW YORK Perpetual Fair will take place March 2d, in connection with the grand opening of the New York Arcade. It will be very interesting to all visitors, and a great source of benefit to exhibitors of patented goods and works of art, giving them an opportunity of even disposing of their goods, in a manner hitherto unknown in America. The location selected for the Arcade and Halls of Free Exhibition being the best in New York, and the very low prices taxed exhibitors for space and professional services will make it desirable to all ; the perfect system with which the institute is regulated secures to exhibitors and storekeepers a position of the highest order. Copies of the rules and regulations may be had by applying to any officer on the premises, 594 and 596 Broadway, next to the Metropolitan Hotel. N. B.—Send your goods, patents, &c., without delay, when you will receive a certificate of deposit. R. D. GOODWIN, Superintendant, to whom all communications must be addressed. 1*

PRACTICAL INSTRUCTIONS in plating on flowers, &c., with gold, silver or copper, will be forwarded on $1 being enclosed in a letter addressed to Professor RICHARD WOOD, Electro-Metallurgist and Practical Chemist, Box 891, P. O., Hartford, Conn. 26 2*

SMALL PORTABLE STEAM ENGINE AND Boiler for sale, of 1 1-2 horse power, walking beam pattern, brass cylinder pump, and everything complete. The engine is reversible and very highly finished ; was made for and used in a small boat, and can be applied to any purpose ; has been used only one month. Cost $150 will be sold for $90, Address, H. S. TAYLOR, Derby Line, Vt. 1*

PATENT RIGHTS FOR SALE—Loomis' Centrifugal Churn. Murdoch's sawing and planeing Stave Machine. Ames' Polygraph. All best of their kind. Call and see Patent rights bought, sold, and exchanged. All orders and inquiries promptly attended to Commissions right. H. BROWN, Patent Sales Agent No. 121 Nassau st., Room 16, N. Y. 1*

AGENTS WANTED to dispose of an article that sells readily at $5. Useful in every family. Samples sent by mail with terms, &c., for 50 cts. in postage stamps. Orders will be received until the first of April next only. Address, WM. HART, Mayville, Dodge co., Wis. 25 2*

WOOD WORKING MACHINERY—Gray & Wood, and Daniels' Planers Tenoning, molding, power mortising, power hub mortising, and chair-seat machines, turning lathes, broom-handle lathes, scroll saws, saw mandrels, &c. LANE & BODELY, Cincinnati, Ohio. 25 5*

EXCELSIOR STEAM PUMPS, Direct and Double Acting, manufactured and sold at 55 and 57 First street, Williamsburgh, N. Y., and 301 Pearl street, New York. May be seen in operation at J. O. Morse & Co., 79 John st., N. Y. GUILD, GARRISON, & CO, 25 12*

A VALUABLE WATER POWER FOR SALE For particulars, address, DAVID S. McNAMARA, North Hoosick, N. Y. 25 4*

G. B. HARTSON, late proprietor of the Globe Iron Works, having retired from that establishment, will now give his personal attention to executing orders; on commission, for all kinds of machinery, Steam Engines, Boilers, &c. His long experience as a practical engineer and manufacturer will enable him to give general satisfaction ; office, No. 74 Wall st., N. Y. 25 4*

PATENT RIGHTS sold on commission by V. N. BILLINGS, Jackson, Mich. 25 2*

WANTED TO BUY—New and useful inventions, either patent rights or otherwise adapted for this State. Address, S. MASHEIMER, San Francisco, Cal. 25 2*

ENGRAVING ON WOOD and **MECHANICAL** DRAWING, by RICHARD TEN EYCK, Jr., 128 Fulton street, N. Y., Engraver to the Scientific American. 16tf

WILLMER & ROGERS, 42 Nassau street, New York, are the agents in the United States for the following London journals :—

London Engineer, weekly, $10 per year
London Builder, weekly, $7 per year.
Mechanic's Magazine, monthly, $4·50 per year.
Newton's Journal of Arts, monthly, $4·50 per year.
Repertory of Inventions, monthly, $12 per year.
Practical Mechanic, monthly, $4·50 per year.
Journal of Gas Lighting, fortnight, $8 per year.
Gas and Water Times, fortnight, $5 per year.
Building News, weekly, $7 per year.
Architect and Civil Engineer, monthly, $8 per year.

Willmer & Rogers will import any newspaper, magazine, or book published in Europe. WILLMER & ROGERS, Agents for all foreign newspapers, &c. 24 4*

PORTABLE STEAM ENGINES for driving printing presses, circular saws, &c., that for beauty of design, durability, economy of fuel, space, and safety are unrivaled, on hand and built to order. E. AYER, Norwich, Conn. 24 3*

COMMERCIAL AGENTS, able and honest Men from N. England or N. York. A.W. Harrison, Phila. 16 13*

THE ENGINEER is a weekly illustrated London Newspaper devoted to matters interesting to machinists, engineers, to patent inventions, &c. The Engineer contains from ten to fifteen illustrations every week of the most important patent inventions, with full descriptions. Also abstracts of specifications of the patents entered for the week at the London Patent Office, and is, by far, the most important and valuable work ever issued for inventors. Subscription, Ten dollars per year. WILLMER & ROGERS, Agents, New York. 24 4*

LEONARD TILTON,—Improved Patent Woodworth Planing, Tongueing, and Grooving Machines, manufactured at 155 west 33d st., between 7th and 8th avenues, New York. The builder has had 20 years' experience in the art of planing machinery, which he insures those who may favor him with a call to give perfect satisfaction. For reference—can be seen running at the Bank st. Planing Mill or Roachs' Saw Mill opposite, near West st., New York. Machines repaired. All orders thankfully received, and filled at the shortest notice. 24 4*

FOR SALE CHEAP—One 20-horse Tubular Boiler, and one 8-horse Upright Engine, in complete order and nearly new. Address, CARPENTER & PLASS, 24 3* 479 First ave., New York.

STEADY POWER and Light Rooms, at low rates by JOHN GANDU 102 Walker st. 24 8*

SUPERIOR MACHINISTS TOOLS by CARPENTER & PLASS, of every size and description, and considered by all who have used them the best in market, at No. 479 First Avenue, New York. 23 4*

J. HERVA JONES' Double or Single Hand Planting Machines.—Farmers and Dealers please send for a circular containing a full description of these valuable implements. Over 200,000 acres of corn have been planted with them since their introduction! J.H. JONES & CO., Rockton, Winnebago co., Ill. 23 4*

RECIPE FOR MAKING HONEY as good as that made by bees, and which does not cost over six cents per pound, sent for one dollar. N. R. GARDNER, Peace Dale, R. I . 24 6*

SECOND-HAND MACHINERY FOR SALE—One Planer, will plane 10 ft. long, 3 ft. wide, 3 ft. high, cost $860 ; price $550, cash. One Planer, will plane 5 ft. long, 20 inches wide, 16 inches high. cost $350 ; price, $250, cash. One Engine Lathe, will turn 13 feet long. swing 20 inches, weight rest, and chain feed, cost $350 ; price $225, cash. One Engine Lathe, will turn 8 feet long, swing 20 inches, weight rest, and chain feed, cost $200 ; price $130, cash. All of the above are in perfect order. GEO. S. LINCOLN & CO., Hartford, Ct. 23tf

NEW MACHINERY FOR SALE—On hand, No. 0 Lathes. 8 ft. bed. swing 16 inches, weight rest. price $250 ; No. 1, 10 ft. bed, swing 20 inches, gib'd rest, price $315 ; No. 2, 14 ft. bed, swing 30 inches, gib'd rest, price $525. All of the above are Screw Cutting Engines with rack and screw feed combined. Milling Machines for gun work, complete, for $320, cash. All of the above are warranted first-class work. GEO. S. LINCOLN & CO., Hartford, Ct. 23tf

INVENTIONS, DISCOVERIES AND INFORMATION which, in the opinion of the London Society of Arts, are now required by the public. This list which contains 47 subjects, embraces wants in many of the Mechanic Arts. The list and explanation occupies a portion of three pages of J. R. Stafford's Family Receipt Book, which book will be sent free of postage on receipt of Ten cents or stamps, by J. R. STAFFORD, Practical Chemist, 16 State st., New York. 21 8*

SOUTHERN MACHINERY DEPOT—Number 98 Magazine st., New Orleans. Agencies and consignments of machines adapted to the Southern wants respectfully solicited. D. C. LOWBER. 20 7*

PORTABLE STEAM ENGINES.—S. C. HILLS No. 12 Platt st., N. Y., offers for sale these Engines, with Boilers, Pumps, Heaters, etc., all complete, and very compact, from 2 to 10 horse power, suitable for printers, carpenters, farmers, planters, &c. A 2 1-2 horse can be seen in store, it occupies a space 5 by 3 feet, weigh 1500 lbs., price $240 ; other sizes in proportion. 1 e3w

CLOCKS FOR CHURCHES, Court Houses, &c. (First Premium, latter at the Fair 1856 and 1857 ;) also Regulators and Time Pieces for jewellers, Railroads, &c. ; illuminated dials of all sizes, all warranted. Address JOHN SHERRY, Oakland Works, Sag Harbor, N. Y. 23 12eow

SWISS DRAWING INSTRUMENTS—A full stock of these celebrated instruments always on hand. Catalogues gratis. AMSLER & WIRZ, 20 14*eow 211 Chestnut st., Philadelphia.

J. R. STAFFORD'S FAMILY RECEIPT Book, contains 150 Family Receipts, many of which are new, and all of which are practical, besides much valuable information for mechanics and others. The above book will be sent free of postage on receipt of Ten cents or stamps, by J. R. STAFFORD, Practical Chemist, No. 16 State st., New York. 21 8*

MACHINE BELTING, Steam Packing, Engine Hose.—The superiority of these articles manufactured of vulcanized rubber is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The hose never needs oiling, and is warranted to stand any required pressure ; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise, at our warehouse. New York Belting and Packing Co., JOHN H. CHEEVER, Treasurer, No. 6 Dey street, N. Y. 22tf

THE BEST PLANING, TONGUEING, AND GROOVING MACHINE IN THE WORLD. —Patented November, 21st, 1854, and November. 13th, 1855. These patents were obtained for improvements upon the celebrated Woodworth Planing Machine, the patent for which expired Dec. 26, 1856. By the combination of these several inventions a machine is produced of unrivalled excellence. A Gold Medal for this invention was awarded by the Mass. Char. Mech. Asso., at their Exhibition of 1856. Machines of all kinds and sizes, from $150 to $2000. All machines warranted to give entire satisfaction, and to be superior to any other machines now in use. For further information address the patentee. JAMES A. WOODBURY, 20 7* No. Scollay's Building, Court st., Boston, Mass.

PATENT RIGHTS sold on commission by S. C. HILLS, 12 Platt st., New York, who has for sale the following : Clark's Water Feed and Indicator ; Crosby's Slitting Mill ; Devlan, Wood & Hancock's Oil Saver ; Creamer's Car Brake ; Burnham's Suction and Force Pump ; Van De Water's Water Wheel, &c. 20 tf

PAGE'S PATENT PERPETUAL LIME KILN, will burn 100 barrels of lime with three cords of wood every 24 hours ; likewise my coal kiln will burn 150 bushel with 1 tuh bituminous coal in the same time ; coal is not mixed with limestone. Rights for sale. 23tf C. D. PAGE, Rochester, N. Y.

WOODWORTH'S PATENT PLANING MAchines of every kind and all prices. A large assortment on hand ; and I am prepared to construct any machine to order from ten days to two weeks, and guarantee each machine to be perfect in its construction, and give purchasers entire satisfaction. The patent has expired, and will not be renewed. I make this business exclusive, manufacturing nothing but the Woodworth Machines, and for that reason can make a better article for less money ; and with my fifteen years' experience I fully guarantee each machine to come up to what I am willing to recommend, that is, that each machine shall be more than equal to any other manufactured for the same price. JOHN H. LESTER, 57 Pearl st., Brooklyn, N. Y., three blocks above Fulton Ferry. 20 tf

24 HIGHLY FINISHED ANATOMICAL Engravings of the Human Body, illustrating the Brain, Throat, Bronchial Tubes, Lungs, Heart and Great Arteries—Veins—All of the Muscles and Joints, &c., &c. These engravings are upon a chart, 22 by 30 inches, which is attached to and makes a part of J. R. Stafford's Family Receipt Book. The book and chart will be sent free of postage on receipt of Ten cents or stamps, by J. R. STAFFORD, Practical Chemist, No. 16 State st., New York. 21 8*

JAMES O. MORSE & CO., 79 John street, N. Y. (between William and Gold streets,) Manufacturers and Dealers in all descriptions of Pipes for Steam, Gas, and Water, together with every variety of fittings for the same ; Steam Boilers and Boiler Flues, Stop Valves and Cocks, Steam Whistles, Oil Cups, Gauge Cocks, Governor Valves, Steam and Water Gauges, Steam, Power, and Hand Pumps, Steam Apparatus for warming buildings, Gas Apparatus for towns and factories. 17 13

STOVE POLISH—The best article of the kind yet invented for family use. Sold wholesale and retail at 114 John st., New York, by QUARTERMAN & SON. 12 tf

30 HORSE STEAM ENGINE—At the Crystal Palace, called the "Endeavor," the best engine ever exhibited by the American Institute ; will be sold low if applied for immediately. S. C. HILLS, 10tf 12 Platt street, N. Y.

WOODWORTH'S PATENT PLANING MAchines—Patent expires Dec. 27th, 1856. Machines constantly on hand, together with steam engines and boilers of all sizes. Lathes, planers, drills, circular saw mills, belting of leather and rubber of the best quality, Orders respectfully solicited at the Machinery Depot, 163 Greenwich st., N. Y. A. L. ACKERMAN. 21 8

FORBES & BOND, Artists, 89 Nassau st, N.Y., Mechanical and general Draughtsmen on wood, stone, &c

LAP-WELDED IRON BOILER TUBES.—Prosser's Patent.—Every article necessary to drill the tube-plates, and set the tubes in the best manner. 18tf THOS. PROSSER & SON, 28 Platt st., N. Y

50 STEAM ENGINES—From 3 to 40-horse power also portable engines and boilers ; they are first class engines, and will be sold cheap for cash. WM BURDON, 102 Front st., Brooklyn. 14 tf

GOLD QUARTZ MILLS of the most improved construction ; will crush more quartz and do it finer than any machine now in use, and costs much less. WM BURDON, 102 Front st., Brooklyn. 14 tf

OIL ! OIL ! OIL !—For railroads, steamers, and for machinery and burning—Pease's Improved Machinery and Burning Oil will save fifty per cent., and will not gum. This oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The Scientific American, after several tests, pronounced it "superior to any other they have ever used for machinery." For sale only by the Inventor and manufacturer. F. S. PEASE, 61 Main st., Buffalo, N. Y.

N. B.—Reliable orders filled for any part of the United States and Europe. 14 tf

NORCROSS ROTARY PLANING MACHINE.—The Supreme Court of the U. S., at the Term of 1853 and 1854, having decided that the patent granted to Nicholas G. Norcross, of date Feb, 12, 1850, for a Rotary Planing Machine for Planing Boards and Planks is not an infringement of the Woodworth Patent.

Rights to use the N. G. Norcross's patented machine can be purchased on application to N. G. NORCROSS, Office for sale of rights at 27 State street, Boston, and Lowell, Mass. 45 6m*

NEW HAVEN MFG. CO.—Machinists' Tools, Iron Planers, Engine and Hand Lathes, Drills, Bolt Cutters, Gear Cutters Chucks &c., on hand and finishing. These Tools are of superior quality, and are for sale low for cash or approved paper. For cuts giving full description and prices, address, "New Haven Manufacturing Co., New Haven, Conn. 14 tf

HARRISON'S 30 INCH GRAIN MILLS.—Latest Patent.—A supply constantly on hand. Price $200. Address New Haven Manufacturing Co., New Haven, Conn. 14 tf

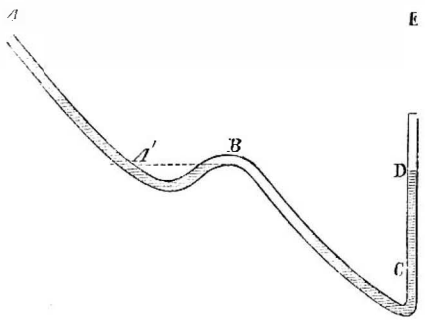
BOILER INCRUSTATIONS PREVENTED—A simple and cheap condenser manufactured by Wm. Burdon, 102 Front st., Brooklyn, will take every particles of lime or salt out of the water, rendering it as pure as Croton, before entering the boiler. Persons in want of such machines will please state what the bore and stroke of the engines are, and what kind of water is to be used. 14 tf

© 1857 SCIENTIFIC AMERICAN, INC.

Science and Art.

Anomalous Action of Water in Crooked Pipes.

We are solicited by a correspondent to explain both the cause and effect of accumulations of air in crooked pipes. It is a subject of great general interest. In almost every case where water under pressure is led over elevations without openings or leaks of some kind, air accumulates and produces the very disagreeable effect of diminishing the pressure or the rise of the fluid at the point of discharge. The evil is so serious that self-acting valves have been applied in some cases at these points, to open whenever the presence of air expelled the water so that it refused to support a float. A very small leak might be allowed in most cases to remain always open, and this would accomplish the same object, though involving a waste of water; but, if practicable, a small pipe carried up from the bend to above the level of the fountain, and kept open at the top, would be a more perfect remedy.



The accumulation is due to the fact that air is always present, in greater or less quantities, in all but very recently distilled water. It exists in very minute particles or bubbles, and is in this form the means of sustaining life in the whole race of fishes which enliven its depths. The lungs or gills of a fish cannot decompose water; the only oxygen fish consume is that freely suspended in the form described. It is a singular fact that the gases naturally absorbed by water from the atmosphere contain a sensibly larger portion of oxygen than common air, a circumstance extremely favorable to submarine existence.

The quantity so absorbed varies with the temperature and with the agitation. The large or small waves caused by wind, assist in "aerating" the water, and a constant agitation tends to hold in suspension any surplus it may contain. But while standing or moving in a pipe, the surplus rises, and having once accumulated in bends refuses to be removed except either by a violent rush, which shall carry it bodily down, or by a long struggle with the passing water, which is thus gradually induced to absorb it.

The accompanying cut illustrates its effect in diminishing the rise of the water at the termination of the pipe. The supply of water is received at A. but the fluid, instead of rising to E, rises only to D, at the other extremity. Explanation is found in the fact that the air retained is not equally divided on each side of the bend, at B, but is all on the side represented, and by being of no appreciable width, its presence diminishes the effect of the head. It is the pressure at C which forces up the water in the pipe, C E, and this ordinarily depends on the hight of the reservoir, A, but all that quantity between B and A', of course, balances itself, and is of ne effect, and if a portion of the remaining length, A C, is air, its effective hight is diminished by the same amount. The water and air will remain under pressure for an indefinite period in the position represented, but if by any means motion be induced, the water will usually flow over the bend at B, and run down to C, without quite filling the pipe, and consequently without removing the air except by the slow absorption referred to. The rise in C D will be diminished still more if there be several bends like B at intervals. The spiral pump, invented in 1746 by a Swiss named Wirtz, is an ingenious application of a similar principle to produce the reverse effect. In this pump the turns of the spiral are partially filled, and all, by compressing the air in the remaining spaces, and accumulating the mass of weight on one side of the center, conspire to force the water to any hight required in the discharge pipe.

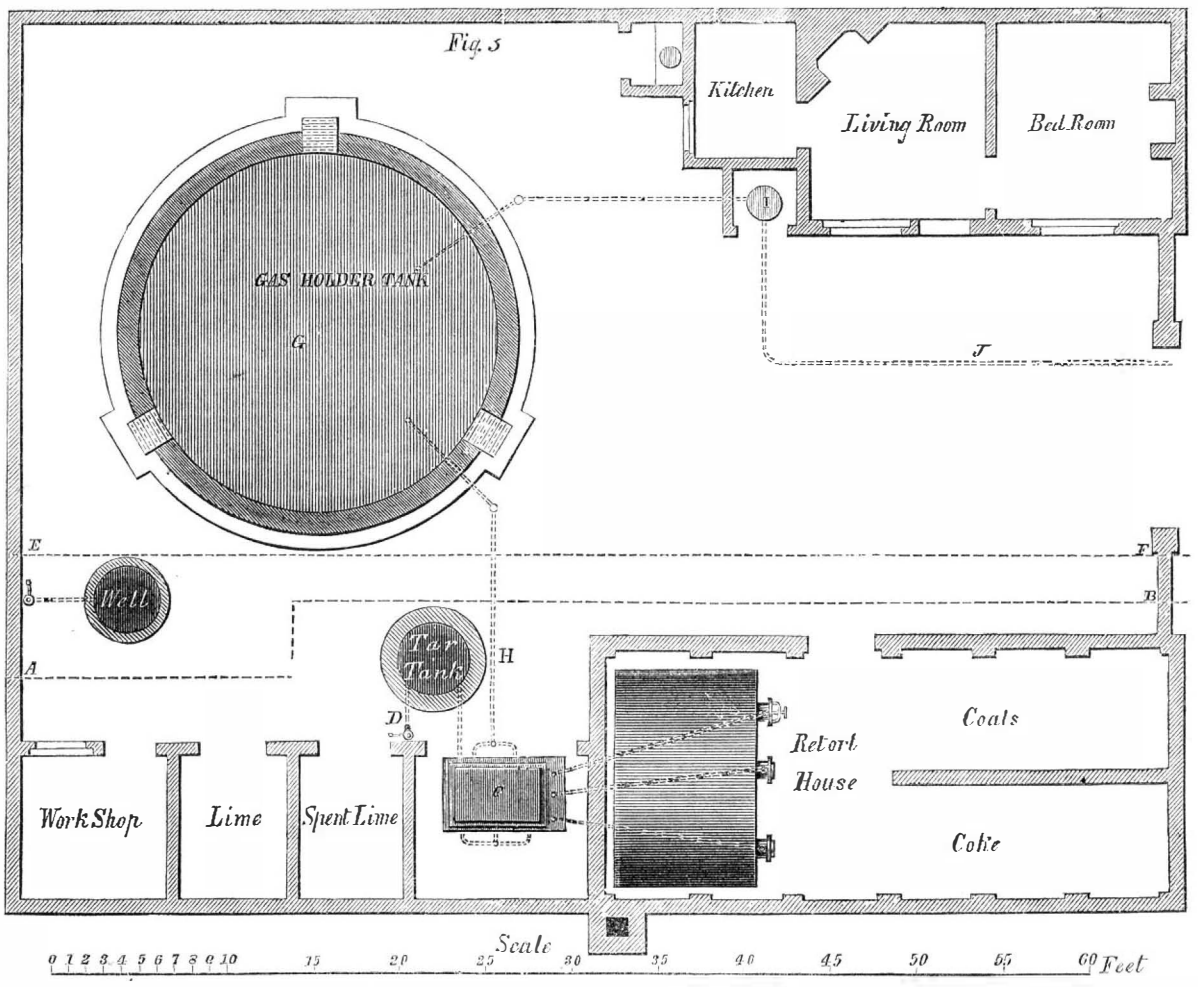
The Egyptian Steam Yacht.

The iron steamship *Voyageur de la Mere* built for the Egyptian Government, was launched at East Boston on the 25th of last month. She is 216 feet long—the largest iron vessel ever built in America, and differs from vessels of this description built elsewhere, in being additionally strengthened with wood. She will, when completed, proceed to Alexandria *via* our city.

The Mechanics' Club.

This Association, which meets at the American Institute Rooms, 351 Broadway, on the 2nd and 4th Wednesday of every month, is worthy the attention of all who can attend either regularly or otherwise. The next question is "The best means of conveying steam from the boiler to the englne."

GAS LIGHT FOR VILLAGES.



(*Continued from First Page.*)

The work and apparatus represented by these engravings are designed for villages containing a population as low as 1000 inhabitants. But if the houses are situated at a considerable distance apart, the original expense of the *plant* is greater, because a much greater length of main and branch pipes are required. Gas, therefore, can be most economically employed where the houses are closely situated together. There are many villages, however, containing from 5000 inhabitants and upwards, whose streets and lanes are nightly submerged in darkness; these, we believe, might have their streets rendered cheerful and luminous at no very great expense, by gas light. It may be difficult for the inhabitants of some villages to raise the capital necessary for the erection of such works, but the way this difficulty has been overcome in England, is perhaps worthy of imitation here. An association has been formed with considerable capital, and with a staff of experienced and competent officers, who can estimate the exact expense of erecting gas works in any place, according to its location and the number of its inhabitants. If application be made to this company, by authorized persons from any town or village to erect gas works, they at once dispatch an officer to survey the place, and, upon his report, an answer is returned. Their custom is to erect the whole works, lay all the main pipes, and supply the meters and fixtures at their own cost, charging a certain amount per thousand cubic feet of gas consumed, and a rent for the meters and fixtures. This is the way the company will contract for supplying gas to any place; or else it will erect the works and put them in complete working order for a specified sum, or admit villages to hold any amount of stock which they can afford to purchase. They have erected works upon this principle in a number of small towns, all of which have proved profitable investments. One feature in the arrangements of this company should be carried out in all our cities where gas is now used, viz., the supplying of lateral pipes, meters, and fixtures, at a fixed rent, to those landlords who may apply for them. If this method were carried out, the consumption of gas would be vastly increased, because thousands of tenants—mechanics, and other working men—would prefer to use it in preference to any other kind of light. And as the profits of the company would increase with the increased consumption of gas, this plan would lead to a general reduction in the price of gas to all the citizens.

The apparatus illustrated above is designed for the manufacture of coal gas, and wherever bituminous coal is cheap, it is the most economical gas material. In some places gas from resin or resin oil, or even from some kinds of wood, may be manufactured with advantage. The finer kinds of bituminous coal—such as cannel coal or rich hydro-carbon schale, are the best for gas-making purposes. Nothing is lost, every part of their product is useful. The coal is put into close retorts and submitted to destructive distillation; the volatile matter escapes in the form of gas from the retorts represented in the lower part of figure 3, and passes into the purifier, C, where it is washed, and its impurities removed by coming in contact with wet lime; from thence it passes into the gas holder tank, G, where it is kept for general distribution. The products of the coal are, gas, tar, ammonia, and sulphate of lime; the residue left in the retorts is coke. The coke is excellent for burning in grates or furnaces the tar is useful for preserving the feet of fence posts under-ground, and for roofing sheds and barns, when mixed with dry clay and sand; the spent lime in the purifier is a good disinfecting agent: thus all the products of the coal employed in gas lighting, may be utilized. This subject is engaging no small amount of attention at present, both in this country and Great Britain, and any improvement or economy in the production or purification, is worthy of extensive diffusion. Many of our factories are lighted quite successfully from miniature private gas works, and it has even been attempted with tolerable success on one of the large steamboats navigating the Hudson river, the gas works being so small and inoffensive as to be stored on board without serious inconvenience.

Inventors, and Manufacturers

TWELFTH YEAR

PROSPECTUS OF THE

SCIENTIFIC AMERICAN.

This work differs materially from other publications being an ILLUSTRATED PERIODICAL, devoted chiefly to the promulgation of information relating to the various Mechanic and Chemic Arts, Industrial Manufactures, Agriculture, Patents, Inventions, Engineering, Millwork, and all interests which the light of PRACTICAL SCIENCE is calculated to advance.

The *SCIENTIFIC AMERICAN* is printed once a week, in convenient quarto form for binding, and presents an elegant typographical appearance. Every number contains *Eight Large Pages*, of reading, abundantly illustrated with *ORIGINAL ENGRAVINGS*—all them engraved expressly for this publication.

All the most valuable patented discoveries are delineated and described in its issues, so that, as respects inventions, it may be justly regarded as an ILLUSTRATED REPERTORY, where the inventor may learn what has been done before him, and where he may bring to the world a KNOWLEDGE of his own achievements.

REPORTS OF U. S. PATENTS granted are also published every week, including *Official Copies* of all the PATENT CLAIMS. These Claims are published in the SCIENTIFIC AMERICAN *in advance of all other papers.*

Mechanics, Inventors, Engineers, Chemists, Manufacturers, Agriculturists, and *People of every Profession in Life*, will find the *SCIENTIFIC AMERICAN* to be of great value in their respective callings.

Much might be added in this Prospectus, to prove that the SCIENTIFIC AMERICAN is a publication which every Inventor, Mechanic, Artisan, and Engineer in the United States should patronize; but the publication is so thoroughly known throughout the country, that we refrain from occupying further space.

TERMS OF SUBSCRIPTION—$2 a year, or $1 for six months.

Post-pay all letters, and direct

MUNN & CO.

128 Fulton street, New York

© 1857 SCIENTIFIC AMERICAN, INC.